

**FOUNDATION INVESTIGATION AND DESIGN REPORT
HIGHWAY 427 WIDENING
FROM FASKEN DRIVE TO STEELES AVENUE
HIGH MAST LIGHTING POLES
OVERHEAD SIGN SUPPORTS
TORONTO, ONTARIO
G.W.P. 202-95-00**

Geocres Number: 30M12-291

Report to

SNC-Lavalin

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OHS\199270_HML and OHS FIDR_Final.doc

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PART 1: FACTUAL INFORMATION

1 INTRODUCTION

This report presents the factual findings obtained from previous and current foundation investigations conducted for the Ministry of Transportation Ontario (MTO) for the design of High Mast Lighting (HML) poles and bridge structures on Highway 427 from Fasken Drive to Steeles Avenue in Toronto, Ontario. This information has been used to develop foundation recommendations for HML poles and Overhead Sign (OHS) supports for the proposed inside widening of Highway 427.

Thurber carried out this study as a sub-consultant to SNC-Lavalin under the Ministry of Transportation Ontario (MTO) Agreement Number 2004-E-0071.

During the preparation of this report, reference has been made to the subsurface conditions and foundation recommendations from the 1995 report below, which is included in this document as Appendix A:

- MTO report titled “Foundation Investigation Report for High Mast Lighting, Hwy. 427 from Campus Rd/Fasken Dr. To Steeles Ave., W.P. 615-89-00, Hwy. 427, District 6, Toronto, GEOCRE 30M12-224, Jan. 25, 1995.

Reference has also been made to the subsurface conditions from several other reports; a list of referenced reports is included in Appendix B with the borehole logs.

2 PROJECT AND SITE DESCRIPTION

The inside widening of Highway 427 from Fasken Drive to Steeles Avenue includes the installation of a number of high mast lighting poles and overhead signs. Highway 427 is currently a 6-lane highway, surrounded by industrial, commercial and residential properties along the route.

The site is situated within the South Slope physiographic region. The geology generally comprises a till plain consisting of clayey silt to silty clay till (Halton Till) grading into a sandy silt to silty sand till with depth. The underlying bedrock consists of grey shale with hard siltstone and limestone interlayers of the Georgian Bay Formation.

3 SITE INVESTIGATION AND FIELD TESTING

A site investigation was not carried out as part of the current project. Instead, borehole information from the previous investigations at the site has been used. Tables 1 and 2 at the end of the text outline the reference boreholes to be used to assess the subsurface conditions at the HML poles and OHS supports respectively. These are generally based on the closest available boreholes to each HML pole or OHS support. When the closest available borehole to an HML pole was not included in the 1995 MTO report referenced above, the nearest borehole from the 1995 MTO report with similar stratigraphy has also been included in Table 1 for additional reference. Since the majority of the boreholes were drilled in 1972, it is possible that the current ground surface elevations may differ and the subsurface stratigraphy may include additional fill that is not shown on the reference borehole logs. Additional boreholes include 20 boreholes drilled by MTO in 1994 for the design of HML pole foundations. Furthermore, as part of the current assignment, several boreholes were drilled by Thurber Engineering Ltd. in 2008 for the proposed widened bridge structures. The approximate locations of the HML poles, OHS supports, and boreholes are shown on the Borehole Location Drawings in Appendix D. The project reference numbers for boreholes drilled during previous projects are also shown on the plan.

4 DESCRIPTION OF SUBSURFACE CONDITIONS

Details of the encountered soil stratigraphy are presented on the borehole logs in Appendices A and B obtained from the previous investigations. A general description of the overall stratigraphy is given below. However, the factual data presented in the borehole logs governs any interpretation of the site conditions.

4.1 General

In general, the native soil stratigraphy encountered at this site consists of glacial till; varying in composition from clayey silt to silty clay, with sand and trace gravel. Layers of sandy silt and silty sand were also occasionally encountered in the native soil. Although not encountered at all boreholes, cobbles and boulders are frequently present within glacial till deposits, and should be anticipated to be encountered during foundation construction. Overlying the till, many of the boreholes encountered fill at the ground surface. However, the majority of the boreholes were drilled in 1972, and therefore some of the existing embankment fill was not investigated. The presence of additional fill that is not shown on the borehole logs should be anticipated during construction, as well as differences in the ground

surface elevation. Shale bedrock was also encountered below the till in several boreholes. Where encountered, the bedrock elevation ranged from 132.3 m to 162.3 m.

4.2 Groundwater Conditions

Water levels were observed in the boreholes during drilling and in standpipe piezometers following completion of drilling. Standpipe piezometers were installed in several boreholes throughout the site. Groundwater levels are shown on the individual borehole logs, but ranged from elevation 153.3 m to 171.8 m.

The above values are short-term readings and seasonal fluctuations of the groundwater level are to be expected. In particular, the groundwater level may reach higher elevations after the spring snowmelt or after periods of heavy rainfall. Further, perched water may be encountered at higher levels in pockets or zones of more permeable sands and silts present within the heterogeneous tills, or within the fill.

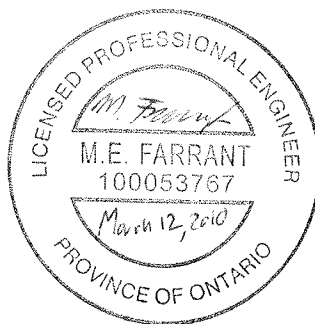
5 MISCELLANEOUS

Interpretation of the subsurface data and preparation of this report were carried out by Mr. Mark Farrant, P.Eng.

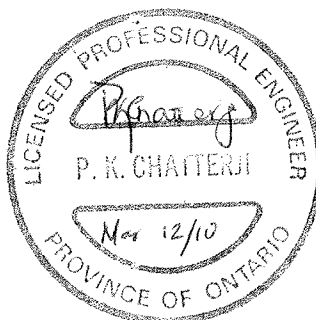
Dr. P.K. Chatterji, P.Eng., a Designated Principal Contact for MTO Foundations Projects, reviewed the report.

THURBER ENGINEERING LTD.

Mark Farrant, P.Eng.
Geotechnical Engineer



P.K. Chatterji, P.Eng.
Review Principal



**FOUNDATION INVESTIGATION AND DESIGN REPORT
HIGHWAY 427 WIDENING
FROM FASKEN DRIVE TO STEELES AVENUE
HIGH MAST LIGHTING POLES
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Geocres Number: 30M12-291

PART 2: ENGINEERING DISCUSSIONS AND RECOMMENDATIONS

6 INTRODUCTION

This section of the report presents foundation recommendations for the design of the proposed high mast lighting (HML) poles and overhead sign (OHS) supports.

The project includes the installation of 49 HML poles and 24 overhead signs. There are 35 HML poles located at the centreline of the highway median, with 14 poles located near interchange ramps. The overhead signs include 13 Tri-Chord type support structures, which are located in both the northbound and southbound lanes, and 11 Cantilever support structures, which are located in the highway median.

All relevant boreholes for the HML poles and OHS supports are included in Appendices A and B. The 1995 MTO report for HML poles is included in Appendix A.

The discussion and recommendations presented in this report are based on Thurber's understanding of the project and on the factual data obtained from the previous investigations.

7 FOUNDATION DESIGN

As per the November 30, 2009 meeting at the MTO Foundations Office in Toronto, it was agreed that a standard foundation design should be used for both HML pole and OHS support foundations, based on the information available from the previous borehole investigations.

For design of the HML pole foundations, reference should be made to the following documents.

- Ministry of Transportation, Ontario (2004) "Guidelines for the Design of High Mast Pole Foundations", Fourth Edition, BRO-009, Engineering Standards Branch, Bridge Office.

- Canadian Highway Bridge Design Code and Commentary (2000). CAN/CSA-S6-00 and S6.1-00.

A typical HML pole is supported on a single conventional augered caisson (drilled shaft). Most of the caisson foundations for the HML poles will be embedded into stiff to hard glacial till or possibly fill. Based on the available subsurface information, a standard foundation design for HML pole foundations for this project should be caissons drilled to a minimum of 8 m below the final grade level. The diameter of the caissons should be determined based on the above documents and various applied loadings.

For design of the OHS support foundations, reference should be made to the following:

- Ministry of Transportation, Ontario (April, 2007) “Sign Support Manual”, Policy, Planning and Standards Division, Bridge Office.

Based on the available subsurface information, a standard foundation design for the OHS supports for this project should be caissons drilled to 6.2 m below the final grade level. This is based on the frost depth of 1.2 m for the site area, plus 5 m. The diameter of the caissons should be determined based on the above manual and various applied loadings.

8 CAISSON INSTALLATION

Caisson installation should generally be carried out in accordance with SP 903S01 – Construction Specification for Installation of Caisson Piles. The contract documents should contain an NSSP alerting the contract bidders of the specific aspects relating to caisson construction for HML pole and OHS support foundations at this site. Suggested wordings for this NSSP are provided in Appendix C.

Caisson installation equipment should be able to dislodge, handle and remove cobbles, boulders and other obstructions, which may be present in the glacial till or the overlying fill.

Soil sloughing and water seepage may occur in unsupported holes. Temporary liners should be available to support the caisson sidewalls and to provide seepage cut-off where required.

9 CONSTRUCTION CONCERNS

Concerns during caisson construction mainly involve the handling and removal of cobbles or boulders, soil sloughing and water seepage from caisson sidewalls. Recommendations on how to address these issues have been outlined in the previous section.

10 CONSTRUCTION INSPECTION AND TESTING

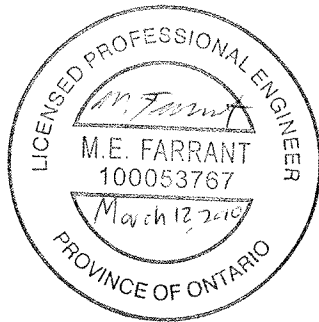
Caisson construction should be monitored by qualified geotechnical personnel (as per SP 903S01) to verify the soil conditions and to confirm that those conditions are consistent with the design assumptions in this report.

11 CLOSURE

Engineering analysis and preparation of this foundation design report was carried out by Mr. Mark Farrant, P.Eng.

The report was reviewed by Dr. P.K. Chatterji, P.Eng., a Designated Principal Contact for MTO Foundations Projects.

THURBER ENGINEERING LTD.



Mark Farrant, P.Eng.
Geotechnical Engineer



P.K. Chatterji, P.Eng.
Review Principal

Table 1 – Reference Borehole Numbers for HML Poles

HML Pole Number	Reference Borehole Number	Project Reference Number on Borehole Log	Additional Reference Borehole and Project Number
P1	4	273-66	
P2	1	615-89-00	
P3	1	615-89-00	
P4	2	615-89-00	
P5	2	615-89-00	
P6	18	657-93-01	2 (615-89-00)
P7	27	657-93-01	13 (404-65)
P8	4	615-89-00	
P9	4	615-89-00	
P10	4	615-89-00	
P11	3	387-65	7 (280-65)
P12	18	387-65	5 (615-89-00)
P13	5	615-89-00	
P14	1	659-93-01	4 (48-71-22)
P15	10	213-65	
P16	6	660-93-01	6 (48-71-22)
P17	6	48-71-22	
P18	6	615-89-00	
P19	6	615-89-00	
P20	7	615-89-00	
P21	7	615-89-00	
P22	8	615-89-00	
P23	9	615-89-00	
P24	9	615-89-00	
P25	1	126-60	
P26	1	126-60	
P27	7	126-60	
P28	5	126-60	

Table 1 – Continued

HML Pole Number	Reference Borehole Number	Project Reference Number on Borehole Log	Additional Reference Borehole and Project Number
P29	10	615-89-00	
P30	10	615-89-00	
P31	10	615-89-00	
P32	11	615-89-00	
P33	11	615-89-00	
P34	12	615-89-00	
P35	2	604-89-00	
P36	2	604-89-00	
P37	13	615-89-00	
P38	13	615-89-00	
P39	14	615-89-00	
P40	15	615-89-00	
P41	15	615-89-00	
P42	15	615-89-00	
P43	1	49-71-04	
P44	16	615-89-00	
P45	1	49-71-07	
P46	7	49-70-05/06	1 (49-71-07)
P47	17	615-89-00	
P48	18	615-89-00	
P49	18	615-89-00	

Table 2 – Reference Borehole Numbers for OHS Supports

OHS Support Station Number	Direction	Support Structure Type	Reference Borehole Number	Project Reference Number on Borehole Log
20+411	NB	Tri-chord	4, 6	273-66
20+800	SB	Cantilever	1	615-89-00
20+871	NB	Tri-Chord	2	615-89-00
22+050	NB	Cantilever	5	615-89-00
22+588	SB	Tri-chord	5, 6	660-93-01
22+900	SB	Cantilever	6	615-89-00
23+039	SB	Tri-chord	6	615-89-00
23+059	NB	Tri-chord	6	615-89-00
23+200	NB	Cantilever	7	615-89-00
23+429	NB	Tri-chord	8	615-89-00
23+845	NB	Cantilever	1	126-60
23+909	SB	Cantilever	7	126-60
24+322	SB	Tri-chord	11	615-89-00
24+809	SB	Cantilever	2	604-89-00
24+900	NB	Tri-chord	2	604-89-00
25+275	NB	Tri-chord	14	615-89-00
25+800	SB	Cantilever	5	49-71-04
25+900	NB	Cantilever	16	615-89-00
26+235	SB	Tri-chord	17	615-89-00
26+691	NB	Tri-chord	18	615-89-00
26+781	SB	Tri-chord	19	615-89-00
27+151	NB	Tri-chord	CNH-01, 2	202-95-00, 153-80-02
27+350	SB	Cantilever	2	153-80-03
27+750	SB	Cantilever	20	615-89-00

Appendix A

1995 MTO Report for High Mast Lighting Poles

ENGINEERING MATERIALS OFFICE
FOUNDATION DESIGN SECTION

WP 615-89-00 DIST 6
HWY 427 STR SITE -

High Mast Lighting
Hwy. 427 from Campus Rd./Fasken Dr. to Steeles Ave.

DISTRIBUTION

V.F. Boehnke (3)
D. Billings
W. Peck (2)
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M. Holowka
J. Robinson
E.A. Joseph
F. Bacchus (Cover Only)
File

GEOCRES 30M12-224

DATE **JAN 25 1995**

GEOCREs No
30M12-224

FOUNDATION INVESTIGATION REPORT
For
High Mast Lighting
Hwy. 427 from Campus Rd/Fasken Dr. to Steeles Ave.
W.P. 615-89-00
Hwy. 427, District 6, Toronto

INTRODUCTION

This report presents soil information for the proposed high mast lights at the above mentioned sites. Soil information was obtained from previous subsurface investigations in the area and supplemented by drilling 20 new boreholes (BH1 through BH 20). The details of the previous investigations are provided in Table 2 (Reference Borehole Number). This report is produced at the request of Central Region Structural Section.

SITE DESCRIPTION

The high mast lighting poles will be located along the proposed Highway 427 alignment from Campus Road/Fasken Drive to Steeles Ave. The area is situated in the City of Etobicoke in the Region of Metro Toronto.

The site lies within the physiographic region known as the South Slope (after Chapman and Putnam, 1984) and it consists largely of glacial deposits.

INVESTIGATION PROCEDURES

The fieldwork for the supplementary investigation was carried out between 94 08 09 and 94 08 19 and consisted of 20 sampled boreholes (BH 1 through BH 20) advanced to depths ranging from 9.2 to 12.6m below ground surface. All boreholes except one, were drilled in the median of Hwy 427. Only Borehole 3 was drilled near 409E - 427S ramp.

The boreholes were advanced using a CME 55 track-mounted auger machine equipped with solid and hollow stem augers.

Sampling was carried out at each borehole location by means of a 50mm O.D. split spoon sampler driven into the soil according to the specifications of the Standard Penetration Test (ASTM D 1586).

Groundwater levels were obtained by monitoring the levels in the open boreholes throughout the duration of the field investigation. All boreholes were backfilled at the completion of the fieldwork.

SUBSURFACE CONDITIONS

General

The soil generally consists of glacial till deposits as the native soil. At some locations glacial till is overlain by fill material. The native soil generally consists of clayey silt with layers of silt, sandy silt and silty sand. The glacial deposits occasionally contain cobbles and boulders. The site for the proposed high mast light poles covers a stretch of six kilometres. Hence, the composition of the till is variable. However, the composition of till within short distances are consistent. For soil condition detail at any high mast light location, reference is made to the attached log sheets and Table 1 (Reference Borehole Numbers).

The locations of the boreholes are shown on the attached drawings DWG 6158900 A - C.

Groundwater Conditions

In the previous and recent studies, groundwater was encountered in almost all boreholes. Groundwater table elevation ranged from 153.8m (HML Pole 16, BH 7, W.P. 280-65) to 171.8m (HML Pole 54, BH 9, W.P. 615-89-00). However, in some boreholes groundwater didn't establish shortly after their completion. For groundwater information at each HML locations reference is made to the attached borehole logs.

DISCUSSION AND RECOMMENDATIONS

It is proposed to install 59 high mast lighting poles (P1 through P59) along Highway 427 from north of Campus Road/Fasken Drive to south of Steeles Avenue. The details of high mast lighting poles locations and elevations are attached to this report in Appendix A.

The High Mast Lighting poles will be founded on single reinforced concrete caissons. The foundations for HML should be designed in accordance with the methods described by B.B. Broms in the following two papers:

Broms, B.B.; Lateral Resistance of Piles in Cohesive Soils,
Journal of the Soil Mechanics and Foundations Division,
ASCE, Vol.90, No.SM2, Paper 3825, March 1964.

Broms, B.B.; Lateral Resistance of Piles in Cohesionless Soils,
Journal of the Soil Mechanics and Foundations Division,
ASCE, Vol.90, No.SM3, Paper 3909, May 1964.

There will be no grade changes at five HML pole locations. At all other locations grade will be changed. Generally, grade will be raised. Fill height will range from 0.1m to 2.7m. On average, fill will be about 1.5m high. Grade will be lowered at six locations. Cut depth will range from 0.1m to 0.4m. The details of grade changes are as follows:

<u>HML Pole</u>	<u>Change in Grade</u>	<u>HML Pole</u>	<u>Change in Grade</u>
P1	Fill 1.3	P31	Cut 0.3
P2	Fill 1.9	P32	Fill 0.4
P3	Fill 1.9	P33	Fill 1.8
P4	Fill 1.6	P35	Fill 1.7
P5	Fill 1.8	P36	Fill 1.6
P8	Cut 0.1	P37	Fill 1.6
P9	Fill 0.1	P38	Fill 1.8
P10	Fill 0.4	P39	Fill 1.7
P11	Fill 0.3	P40	Fill 1.9
P12	Fill 0.1	P41	Fill 2.2
P13	Cut 0.2	P42	Fill 2.3
P14	Fill 1.6	P43	Fill 1.8
P15	Cut 0.4	P45	Cut 0.1

<u>HML Pole</u>	<u>Change in Grade</u>	<u>HML Pole</u>	<u>Change in Grade</u>
P16	Fill 1.1	P46	Fill 0.4
P17	Fill 1.4	P47	Fill 0.3
P18	Fill 1.3	P48	Fill 1.8
P19	Fill 1.7	P49	Cut 0.3
P20	Fill 1.5	P50	Fill 2.7
P21	Fill 2.1	P51	Fill 1.7
P22	Fill 1.8	P52	Fill 1.7
P23	Fill 1.6	P53	Fill 1.6
P24	Fill 1.6	P54	Fill 1.8
P25	Fill 1.5	P55	Fill 2.1
P26	Fill 1.6	P56	Fill 2.0
P27	Fill 1.4	P57	Fill 0.6
P28	Fill 1.7	P58	Fill 0.7
P30	Fill 1.7	P59	Fill 0.6

Cut Considerations

If the grade is to be lowered at the pole locations then, the most critical lowest surface elevations should be assumed for design purposes.

Fill Considerations

It should be assumed that the existing or proposed fill will not provide any lateral resistance unless it is carefully engineered.

Any organic and soft material should be removed before placing the fill material. The fill material should consist of acceptable soil free of organics. The fill should be placed and compacted as per MTO standard.

For design purposes following parameters should be used taking into consideration that only half of the fill height would provide lateral support:

$$\phi = 30^\circ$$

$$\gamma = 20 \text{ kN/m}^3$$

It should be assumed that soil in the zone of frost penetration does not provide any lateral resistance. The depth of frost penetration at this site is 1.2m.

Slope Considerations

For HML poles near slopes, the caisson should be a minimum 3m from the crest of the 2H:1V downslope. The upper 50% of the embedment length within the embankment (taken from frost penetration depth) should be disregarded for lateral resistance. If the caisson for HML foundations are constructed at a distance of 3m from the crest of a 3H:1V and 4H:1V slopes the reduction in embedment length would be 25% and 0% respectively.

The design values at each of the HML locations are as follows:

SOIL PARAMETERS AT EACH HIGH MAST LIGHT POLES

HML Poles	W.L. Elev (m)	Elev (m) From - To	Soil Type	ϕ (Deg)	Q_u kPa	γ kN/m ³
P1	165.4	167.4 - 165.1	Fill	-	-	-
		165.1 - 161.3	Cohesive	0	350	20.6
		161.3 - 152.0	Cohesive	0	500	21.2
P2	163.4	165.9 - 161.5	Fill	-	-	-
		161.5 - 156.0	Cohesive	0	250	20.2
		156.0 - Below	Cohesive	0	500	21.2
P3	163.4	165.9 - 161.5	Fill	-	-	-
		161.5 - 156.0	Cohesive	0	250	20.2
		156.0 - Below	Cohesive	0	500	21.2
P4	NE	164.5 - 161.6	Fill	-	-	-
		161.6 - 156.0	Cohesive	0	250	20.2
		156.0 - Below	Cohesive	0	500	21.2

P5	NE	164.5 - 161.6	Fill	-	-	-
		161.6 - 156.0	Cohesive	0	250	20.2
		156.0 - Below	Cohesive	0	500	21.2
P6	155.8	160.3 - 153.9	Cohesive	0	300	20.4
		153.9 - 139.0	Non Cohesive	30	0	21.2
P7	158.7	159.7 - 157.0	Cohesive	0	100	19.6
		157.0 - 146.1	Cohesive	0	500	21.2
P8	160.5	161.3 - 154.0	Cohesive	0	250	20.2
		154.0 - 141.5	Cohesive	0	500	21.2
		141.5 - Below	Bedrock	0	750	22.5
P9	155.8	160.3 - 154.0	Cohesive	0	350	20.6
		154.0 - 146.6	Non Cohesive	30	0	21.2
		146.6 - 139.0	Cohesive	0	500	21.2
P10	154.2	163.0 - 153.4	Cohesive	0	200	20.2
P11	157.5	163.4 - 155.0	Cohesive	0	350	20.6
		155.0 - 143.7	Cohesive	0	500	21.2
P12	161.6	163.6 - 159.9	Fill	-	-	-
		159.9 - 152.9	Cohesive	0	250	20.2
		152.9 - 141.2	Cohesive	0	500	21.2
		141.2 - Below	Bedrock	0	750	22.5
P13	158.8	161.1 - 154.9	Cohesive	0	300	20.4
		154.9 - 145.1	Cohesive	0	500	21.2
		145.1 - Below	Bedrock	0	750	22.5
P14	158.8	161.1 - 154.9	Cohesive	0	300	20.4
		154.9 - 145.1	Cohesive	0	500	21.2
		145.1 - Below	Bedrock	0	750	22.5
P15	158.7	166.7 - 160.8	Fill	-	-	-
		160.8 - 154.1	Cohesive	0	300	20.4
P16	153.8	155.7 - 150.7	Cohesive	0	100	19.6
		150.7 - 143.0	Cohesive	0	500	21.2

P17	154.0	155.6 - 149.4	Cohesive	0	200	20.2
		149.4 - 140.4	Cohesive	0	500	21.2
		140.4 - Below	Bedrock	0	750	22.5
P18	167.8	171.8 - 161.7	Fill	0	200	20.2
		161.7 - 159.2	Cohesive	0	500	21.2
P19	163.3	173.0 - 163.9	Fill	0	200	20.0
		163.9 - 160.4	Cohesive	0	400	20.8
P20	164.8	165.9 - 149.4	Cohesive	0	250	20.2
		149.4 - 144.5	Cohesive	0	500	21.2
P21	162.9	165.3 - 154.0	Cohesive	0	200	20.0
		154.0 - 146.7	Cohesive	0	400	20.8
P22	165.0	171.1 - 165.0	Fill	-	-	-
		165.0 - 161.5	Cohesive	0	250	20.2
P23	165.7	168.7 - 166.9	Fill	-	-	-
		166.9 - 158.3	Cohesive	0	150	20.0
P24	165.7	168.7 - 166.9	Fill	-	-	-
		166.9 - 158.3	Cohesive	0	150	20.0
P25	165.5	166.3 - 164.2	Fill	-	-	-
		164.2 - 159.0	Cohesive	0	150	20.0
		159.0 - 156.7	Cohesive	0	350	20.6
P26	165.5	166.3 - 164.2	Fill	-	-	-
		164.2 - 159.0	Cohesive	0	150	20.0
		159.0 - 156.7	Cohesive	0	350	20.6
P27	163.7	165.5 - 164.1	Fill	-	-	-
		164.1 - 157.7	Cohesive	0	150	20.0
		157.7 - 155.9	Non Cohesive	30	0	20.2
P28	161.5	164.6 - 161.0	Cohesive	0	100	19.6
		161.0 - 157.5	Cohesive	0	250	20.2
		157.5 - 155.0	Non Cohesive	30	0	20.0

P29	161.5	164.6 - 161.0	Cohesive	0	100	19.6
		161.0 - 157.5	Cohesive	0	250	20.2
		157.5 - 155.0	Non Cohesive	30	0	20.0
P30	168.2	168.4 - 160.0	Cohesive	0	200	20.0
		160.0 - 157.8	Non Cohesive	30	0	20.0
		157.8 - 153.2	Cohesive	0	450	20.4
		153.2 - 147.2	Non Cohesive	30	0	20.4
		147.2 - 142.1	Cohesive	0	500	21.2
P31	162.5	168.1 - 154.1	Cohesive	0	250	20.2
		154.1 - 151.0	Non Cohesive	30	0	20.0
		151.0 - 147.7	Cohesive	0	500	21.2
P32	167.2	168.0 - 155.0	Cohesive	0	300	20.4
		155.0 - 150.9	Non Cohesive	30	0	19.6
		150.9 - 145.9	Non Cohesive	30	0	21.2
		145.9 - 142.5	Cohesive	0	500	21.2
P33	168.2	168.2 - 152.5	Cohesive	0	350	20.6
		152.5 - 146.2	Non Cohesive	30	0	20.4
		146.2 - 142.9	Cohesive	0	500	21.2
P34	NE	163.1 - 162.0	Cohesive	0	100	19.6
		162.0 - 159.4	Non Cohesive	30	0	19.6
		159.4 - 153.5	Cohesive	0	200	20.0
P35	NE	163.1 - 162.0	Cohesive	0	100	19.6
		162.0 - 159.4	Non Cohesive	30	0	19.6
		159.4 - 153.5	Cohesive	0	200	20.0
P36	159.7	162.1 - 160.7	Cohesive	0	200	20.0
		160.7 - 159.6	Non Cohesive	30	0	20.8
		169.6 - 157.7	Cohesive	0	400	20.8
		157.7 - 153.5	Cohesive	0	300	20.4
		153.5 - Below	Non Cohesive	30	0	21.0
P37	159.7	162.1 - 160.7	Cohesive	0	200	20.0
		160.7 - 159.6	Non Cohesive	30	0	20.8
		169.6 - 157.7	Cohesive	0	400	20.8
		157.7 - 153.5	Cohesive	0	300	20.4
		153.5 - Below	Non Cohesive	30	0	21.0

P38	159.7	161.4 - 160.4	Non Cohesive	30	0	20.0
		160.4 - 157.7	Cohesive	0	200	20.0
		157.7 - 156.1	Cohesive	0	500	21.2
		156.1 - 152.1	Non Cohesive	30	0	21.2
P39	161.5	162.9 - 161.7	Cohesive	0	200	20.0
		161.7 - 158.3	Non Cohesive	30	0	20.2
		158.3 - 150.6	Cohesive	0	500	21.2
P40	160.5	162.5 - 155.4	Cohesive	0	500	21.2
		155.4 - 152.9	Bedrock	0	750	22.5
P41	160.5	162.5 - 155.4	Cohesive	0	500	21.2
		155.4 - 152.9	Bedrock	0	750	22.5
P42	162.3	163.7 - 158.5	Cohesive	0	500	21.2
		158.5 - 154.5	Bedrock	0	750	22.5
P43	162.3	163.7 - 158.5	Cohesive	0	500	21.2
		158.5 - 154.5	Bedrock	0	750	22.5
P44	162.8	164.4 - 163.4	Cohesive	0	250	20.2
		163.4 - 162.3	Non Cohesive	30	0	20.2
		162.3 - 155.1	Bedrock	0	750	22.5
P45	162.8	164.4 - 163.4	Cohesive	0	250	20.2
		163.4 - 162.3	Non Cohesive	30	0	20.2
		162.3 - 155.1	Bedrock	0	750	22.5
P46	167.7	169.7 - 164.0	Cohesive	0	200	20.0
		164.0 - 154.6	Cohesive	0	500	21.2
P47	165.4	168.8 - 166.4	Cohesive	0	200	20.0
		166.4 - 154.8	Cohesive	0	500	21.2
P48	167.4	169.6 - 164.1	Cohesive	0	250	20.2
		164.1 - 154.5	Cohesive	0	500	21.2
P49	157.5	165.3 - 160.9	Fill	-	-	-
		160.9 - 160.1	Cohesive	0	150	19.8
		160.1 - 155.8	Cohesive	0	500	21.2

P50	158.3	160.9 - 157.1	Non Cohesive	30	0	20.4
		157.1 - 153.4	Non Cohesive	30	0	21.2
		153.4 - 151.6	Cohesive	0	500	21.2
		151.6 - 148.4	Bedrock	0	750	22.5
P51	162.6	168.1 - 163.7	Fill	-	-	-
		163.7 - 161.0	Non Cohesive	30	0	19.8
		161.0 - 158.5	Non Cohesive	30	0	21.2
P52	167.5	171.7 - 169.6	Fill	-	-	-
		169.6 - 165.0	Cohesive	0	250	20.2
		165.0 - 163.1	Cohesive	0	500	21.2
		163.1 - Below	Non Cohesive	30	0	21.2
P53	167.5	171.7 - 169.6	Fill	-	-	-
		169.6 - 165.0	Cohesive	0	250	20.2
		165.0 - 163.1	Cohesive	0	500	21.2
		163.1 - Below	Non Cohesive	30	0	21.2
P54	171.8	176.1 - 170.9	Fill	-	-	-
		170.9 - 166.5	Cohesive	0	250	20.2
P55	171.8	176.1 - 170.9	Fill	-	-	-
		170.9 - 166.5	Cohesive	0	250	20.2
P56	171.4	171.9 - 163.0	Cohesive	0	150	19.8
		163.0 - 160.0	Cohesive	0	400	20.8
		160.0 - 158.0	Non Cohesive	30	0	21.2
P57	165.7	171.5 - 162.4	Cohesive	0	200	20.0
		162.4 - 149.8	Non Cohesive	30	0	21.2
P58	171.1	172.1 - 168.0	Cohesive	0	200	20.0
		168.0 - 162.5	Cohesive	0	500	21.2
P59	Dry	179.4 - 173.7	Fill	0	100	19.6
		173.7 - 172.0	Cohesive	0	250	20.2
		172.0 - 169.8	Cohesive	0	500	21.2

Where:

HML	= High Mast Lighting
ϕ	= Apparent angle of internal friction for non-cohesive Soils
Q_u	= Unconfined Compressive Strength (kPa)
γ	= Unit Weight (kN/m ³)
NE	= Water level not established

Construction Consideration:

It is recommended that a non-standard special provision for the construction of HML foundations, should be incorporated in the contract. A copy of the latest NSSP from other project is appended in this report (Appendix 'B') for reference. The contractor should be advised that variable types of subsurface material may be encountered at the high mast light pole locations; and that the soil descriptions in this report are generalized and not site specific. For construction planning purposes it may be assumed that;

- Groundwater is at or near the surface.
- Cohesionless material may be encountered and it would be susceptible to disturbance under conditions of unbalanced hydrostatic head.
- Glacial deposits are anticipated and there is a probability that occasional cobbles and boulders may be encountered within the deposit.

The Contractor is responsible for constructing the high mast pole foundations without disturbing the material at the sides or bases of the foundations. His proposal should be capable of dealing with the above-noted site condition. The Contractor shall submit eight copies of his proposed construction method to the Engineer for review a minimum of 15 working days prior to the commencement of construction of these foundation elements.

Miscellaneous

The soil information for this project was obtained from previous Foundation Investigation in this area and supplemented by drilling 20 new boreholes (BH1 through BH 20). The fieldwork for the supplementary investigation was carried out under the supervision of Lori O'Malley engineering student, using equipment owned and operated by Canadian Soil Drilling. This report was prepared by K.S.Q. Ahmad, Foundation Engineer, reviewed and approved by D. Dundas, Senior Foundation Engineer.



A handwritten signature of K.S.Q. Ahmad in black ink.

K.S.Q. Ahmad, P. Eng.
Foundation Engineer



A handwritten signature of D. Dundas in black ink.

D. Dundas, P. Eng.
Senior Foundation Engineer

W.P. 615-89-00

TABLE 1
REFERENCE BOREHOLE NUMBERS

HML Pole Numbers	Reference B.H. No	Project Numbers on B.H. Logs	Ground Elev. at Boreholes	Existing Grade at HML	Final Grade
P1	4	W.P. 273-66	167.4	168.6	169.9
P2	1	W.P. 615-89-00	165.9	166.6	168.5
P3	1	W.P. 615-89-00	165.9	165.3	167.2
P4	2	W.P. 615-89-00	164.5	164.5	166.3
P5	2	W.P. 615-89-00	164.5	164.5	166.3
P6	10	W.P. 404-65	160.3	164.8	164.8
P7	17	W.P. 403-65	159.7	160.5	160.5
P8	19	W.P. 403-65	161.3	159.6	159.5
P9	10	W.P. 404-65	160.3	159.7	159.8
P10	3	W.P. 615-89-00	163.0	161.4	161.8
P11	12	W.P. 404-65	163.4	161.9	162.2
P12	13	W.P. 404-65	163.6	165.3	165.4
P13	14	W.P. 404-65	161.1	171.2	171.0
P14	14	W.P. 404-65	161.1	167.7	169.3
P15	4	W.P. 615-89-00	166.7	168.6	168.2
P16	7	W.P. 280-65	155.7	170.0	171.1
P17	12	W.P. 280-65	155.6	170.5	171.9
P18	5	W.P. 615-89-00	171.8	171.8	173.1
P19	4	W.P. 48-71-22	173.0	172.4	174.1
P20	10	W.P. 213-65	165.9	173.1	174.6

J&B ①

J&B ③

J&B ②

P21	7	W.P. 48-71-22	165.3	172.0	174.1
P22	6	W.P. 48-71-22	171.1	170.9	172.7
P23	6	W.P. 615-89-00	168.7	169.5	171.1
P24	6	W.P. 615-89-00	168.7	168.0	169.6
P25	7	W.P. 615-89-00	166.3	166.7	168.2
P26	7	W.P. 615-89-00	166.3	165.9	167.5
P27	8	W.P. 615-89-00	165.5	165.5	166.9
P28	9	W.P. 615-89-00	164.6	164.8	166.5
P29	9	W.P. 615-89-00	164.6	165.5	165.5
P30	1	W.P. 126-60	168.4	164.3	166.0
P31	8	W.P. 126-60	168.1	168.8	168.5
P32	7	W.P. 126-60	168.0	168.6	169.0
P33	5	W.P. 126-60	168.2	163.4	165.2
P34	10	W.P. 615-89-00	163.1	165.8	165.8
P35	10	W.P. 615-89-00	163.1	162.9	164.6
P36	11	W.P. 615-89-00	162.1	162.4	164.0
P37	11	W.P. 615-89-00	162.1	161.9	163.5
P38	12	W.P. 615-89-00	161.4	161.4	163.2
P39	2	W.P. 604-89-00	162.9	161.8	163.5
P40	13	W.P. 615-89-00	162.5	162.3	164.2
P41	13	W.P. 615-89-00	162.5	162.8	165.0
P42	14	W.P. 615-89-00	163.7	163.3	165.6
P43	14	W.P. 615-89-00	163.7	164.1	165.9
P44	15	W.P. 615-89-00	164.4	166.7	166.7
P45	15	W.P. 615-89-00	164.4	164.5	166.4
P46	6	W.P. 49-71-04	169.7	169.8	170.2
P47	1	W.P. 49-71-04	168.8	169.7	170.0
P48	5	W.P. 49-71-04	169.6	165.3	167.1

528 ②

P49	16	W.P. 615-89-00	165.3	166.3	166.0
P50	1	W.P. 49-71-07	160.9	165.3	168.0
P51	17	W.P. 615-89-00	168.1	168.1	169.8
P52	18	W.P. 615-89-00	171.7	170.5	172.2
P53	18	W.P. 615-89-00	171.7	172.9	174.5
P54	19	W.P. 615-89-00	176.1	175.1	176.9
P55	19	W.P. 615-89-00	176.1	177.1	179.2
P56	1	W.P. 153-80-02	171.9	179.4	181.4
P57	5	W.P. 153-80-02	171.5	180.5	181.1
P58	2	W.P. 88-78-02	172.1	179.6	180.3
P59	20	W.P. 615-89-00	179.4	179.4	180.0

APPENDIX

EXPLANATION OF TERMS USED IN REPORT

N VALUE: THE STANDARD PENETRATION TEST (SPT) N VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 51mm O.D. SPLIT BARREL SAMPLER TO PENETRATE 0.3m INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WITH A MASS OF 63.5kg, FALLING FREELY A DISTANCE OF 0.76m. FOR PENETRATIONS OF LESS THAN 0.3m N VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. AVERAGE N VALUE IS DENOTED THUS \bar{N} .

DYNAMIC CONE PENETRATION TEST: CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (51mm O.D. 60° CONE ANGLE) DRIVEN BY 475 J IMPACT ENERGY ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 0.3m ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSENESS.

CONSISTENCY: COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH (c_u) AS FOLLOWS:

c_u (kPa)	0 - 12	12 - 25	25 - 50	50 - 100	100 - 200	> 200
	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD

DENSENESS: COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF DENSENESS AS INDICATED BY SPT N VALUES AS FOLLOWS:

N (BLOWS/0.3m)	0 - 5	5 - 10	10 - 30	30 - 50	> 50
	VERY LOOSE	LOOSE	COMPACT	DENSE	VERY DENSE

ROCKS ARE DESCRIBED BY THEIR COMPOSITION AND STRUCTURAL FEATURES AND /OR STRENGTH.

RECOVERY: SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH OF THE CORING RUN.

MODIFIED RECOVERY: SUM OF THOSE INTACT CORE PIECES, 100mm+ IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (RQD), FOR MODIFIED RECOVERY, IS:

RQD (%)	0 - 25	25 - 50	50 - 75	75 - 90	90 - 100
	VERY POOR	POOR	FAIR	GOOD	EXCELLENT

JOINTING AND BEDDING:

SPACING	50mm	50 - 300mm	0.3m - 1m	1m - 3m	> 3m
JOINTING	VERY CLOSE	CLOSE	MOD. CLOSE	WIDE	VERY WIDE
BEDDING	VERY THIN	THIN	MEDIUM	THICK	VERY THICK

ABBREVIATIONS AND SYMBOLS

FIELD SAMPLING

SS SPLIT SPOON	TP THINWALL PISTON
WS WASH SAMPLE	OS OSTERBERG SAMPLE
ST SLOTTED TUBE SAMPLE	RC ROCK CORE
BS BLOCK SAMPLE	PH TW ADVANCED HYDRAULICALLY
CS CHUNK SAMPLE	PM TW ADVANCED MANUALLY
TW THINWALL OPEN	FS FOIL SAMPLE

STRESS AND STRAIN

u_w kPa	PORE WATER PRESSURE
r_u 1	PORE PRESSURE RATIO
σ kPa	TOTAL NORMAL STRESS
σ' kPa	EFFECTIVE NORMAL STRESS
τ kPa	SHEAR STRESS
$\sigma_1, \sigma_2, \sigma_3$ kPa	PRINCIPAL STRESSES
ϵ %	LINEAR STRAIN
$\epsilon_1, \epsilon_2, \epsilon_3$ %	PRINCIPAL STRAINS
E kPa	MODULUS OF LINEAR DEFORMATION
G kPa	MODULUS OF SHEAR DEFORMATION
μ 1	COEFFICIENT OF FRICTION

MECHANICAL PROPERTIES OF SOIL

m_v kPa ⁻¹	COEFFICIENT OF VOLUME CHANGE
C_c 1	COMPRESSION INDEX
C_s 1	SWELLING INDEX
C_α 1	RATE OF SECONDARY CONSOLIDATION
c_v m ² /s	COEFFICIENT OF CONSOLIDATION
H m	DRAINAGE PATH
T_v 1	TIME FACTOR
U %	DEGREE OF CONSOLIDATION
σ'_{VO} kPa	EFFECTIVE OVERBURDEN PRESSURE
σ'_p kPa	PRECONSOLIDATION PRESSURE
τ_f kPa	SHEAR STRENGTH
c' kPa	EFFECTIVE COHESION INTERCEPT
ϕ' °	EFFECTIVE ANGLE OF INTERNAL FRICTION
c_u kPa	APPARENT COHESION INTERCEPT
ϕ_u °	APPARENT ANGLE OF INTERNAL FRICTION
τ_R kPa	RESIDUAL SHEAR STRENGTH
τ_r kPa	REMOULDED SHEAR STRENGTH
S_t 1	SENSITIVITY = $\frac{c_u}{\tau_r}$

PHYSICAL PROPERTIES OF SOIL

P_s kg/m ³	DENSITY OF SOLID PARTICLES	e 1, %	VOID RATIO	e_{min} 1, %	VOID RATIO IN DENSEST STATE
γ_s kN/m ³	UNIT WEIGHT OF SOLID PARTICLES	n 1, %	POROSITY	I_D 1	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
P_w kg/m ³	DENSITY OF WATER	w 1, %	WATER CONTENT	D mm	GRAIN DIAMETER
γ_w kN/m ³	UNIT WEIGHT OF WATER	S_r %	DEGREE OF SATURATION	D_n mm	n PERCENT - DIAMETER
P kg/m ³	DENSITY OF SOIL	w_L %	LIQUID LIMIT	C_u 1	UNIFORMITY COEFFICIENT
γ kN/m ³	UNIT WEIGHT OF SOIL	w_p %	PLASTIC LIMIT	h m	HYDRAULIC HEAD OR POTENTIAL
ρ_d kg/m ³	DENSITY OF DRY SOIL	w_s %	SHRINKAGE LIMIT	q m ³ /s	RATE OF DISCHARGE
γ_d kN/m ³	UNIT WEIGHT OF DRY SOIL	I_p %	PLASTICITY INDEX = $w_L - w_p$	v m/s	DISCHARGE VELOCITY
ρ_{sat} kg/m ³	DENSITY OF SATURATED SOIL	I_L 1	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$	i 1	HYDRAULIC GRADIENT
γ_{sat} kN/m ³	UNIT WEIGHT OF SATURATED SOIL	I_C 1	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$	k m/s	HYDRAULIC CONDUCTIVITY
ρ' kg/m ³	DENSITY OF SUBMERGED SOIL	e_{max} 1, %	VOID RATIO IN LOOSEST STATE	j kN/m ³	SEEPAGE FORCE
γ' kN/m ³	UNIT WEIGHT OF SUBMERGED SOIL				

RECORD OF BOREHOLE No 1

1 OF 1

METRIC

W.P. 615-89-00 LOCATION Coords.: N 4 838 995, E 296 386 ORIGINATED BY LO
 DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Auger COMPILED BY LO
 DATUM Geodetic DATE 1994 08 09 CHECKED BY BB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100	W _P	W	W _L		
185.9	Ground Surface																
0.0	CLAYEY SILT Trace to some Gravel Some Sand Stiff		1	SS	12												
			2	SS	13												
183.0	(FILL MATERIAL)		3	SS	10												
2.0	SANDY SILT Trace of Gravel Trace to some Clay Compact to Dense		4	SS	35												
181.5	(FILL MATERIAL)		5	SS	23												
4.4	Trace Organics		6	SS	19												
			7	SS	20												
	CLAYEY SILT Trace to Some Gravel Some Sand Very Stiff to Hard (GLACIAL TILL)		8	SS	55												
			9	SS	38												
	Brown Grey		10	SS	34												
154.8			11	SS	127	/25cm											
11.1	End of Borehole																

+3, x5: Numbers refer to
Sensitivity

20
15-5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 2

1 OF 1

METRIC

W.P. 615-89-00 LOCATION Coords.: N 4 839 198 E 296 285 ORIGINATED BY LO
DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Auger COMPILED BY LO
DATUM Geodetic DATE 1994 08 09 CHECKED BY BB

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			20	40	60	80	100	W _p	W	W _L		
164.5	Ground Surface															
0.0	CLAYEY SILT Traces of Gravel Some Sand SUFF to Very SUFF		1	SS	23											
	Sand		2	SS	15											
161.6	(FILL MATERIAL)		3 ⁺	SS	18											
2.9	Trace Organics		4	SS	17											
			5	SS	14											
			6	SS	28											
	CLAYEY SILT Trace to Some Gravel Some Sand SUFF to Hard (GLACIAL TILL)		7	SS	50											
			8	SS	63											
	Brown															
	Grey		9	SS	21											
155.1			10	SS	75	/15cm										
9.4	End of Borehole															
	• WATER LEVEL NOT ESTABLISHED DUE TO THE WALLS CAVING AT 8 FEET.															

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 19

FOUNDATIONS OFFICE

JOB 72-11017

LOCATION 15,877,178N. 971,365 E.

ORIGINATED BY H.S.

W.P. 403-65

BORING DATE Jan. 28 & 31, 1972 Feb. 4, 7 & 9, 1972

COMPILED BY T.S.T.

DATUM Geodetic

BOREHOLE TYPE Penn Drill

CHECKED BY *so*

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w			BULK DENSITY γ	REMARKS
ELEV. DEPTH	ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT	20	40	60	80	100	w_p	w	w_L		
161.3	529.3	Ground elevation.														GR. SA. SI. C.
METRIC UNITS		Het. Mix. of clayey silt, sand & gravel.		1	SS	25										El. 520.3 in open B.H.
				2	SS	26										2-17 5. 31
		Brown		3	SS	41										Feb. 28/72
		Grey		4	SS	20										
				5	SS	24										
		Glacial Till.		6	SS	45										
				7	SS	49										3 19 45 32
		Very stiff to hard.		8	SS	123										
				9	SS	88										
				10	SS	102 7/8"										
				11	SS	100 7/8"										
				12	SS	100 7/8"										
146.1	479.3			13	SS	100 7/8"										8 45 31 16
15.2	50.0	With shale fragments.		14	SS	150 7/8"										
141.5	464.3			15	RC	Rec.										
19.8	65.0	Shale bedrock.			BXL	95%										
140.0	459.3	Sound - grey.														
21.3	70.0	End of borehole.														

20
15 \diamond 5 % STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 3

1 OF 1

METRIC

W.P. 615-89-00 LOCATION Coors.: N 4 839 483 E 298 019 ORIGINATED BY L.O.
 DIST 6 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY L.O.
 DATUM Geodetic DATE 1994 08 19 CHECKED BY B.B.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ KN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
163.0																	
0.0	CLAYEY SILT Trace to some Gravel Some Sand		1	SS	28		162										
180.9	(FILL MATERIAL)		2	SS	21												
2.1			3	SS	14												
	Trace Organics		4	SS	22		160										
			5	SS	28												
	CLAYEY SILT Trace to some Gravel Some sand Stiff to Hard		6	SS	31		158										
	(GLACIAL TILL) Sandy Silt Seams		7	SS	36												
			8	SS	22												
	Brown Grey		9	SS	19		156										
153.4			10	SS	28		154										
9.6	End of Borehole																

+3, x5: Numbers refer to
Sensitivity

20
15-25 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE NO 12

CO-ORDS: N 4 839 511, E 296 165

JOB 72-11016

LOCATION 15,877,662 N. 471,669 E.

ORIGINATED BY V.K.

WP 414-65

BORING DATE Feb. 22, 1972

COMPILED BY F.S.T.

DATA Geodetic

BOREHOLE TYPE Penn Drill,

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT w_L			BULK DENSITY γ	REMARKS		
ELEV. DEPTH (m)	ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS/FOOT	BLOWS / FOOT					PLASTIC LIMIT w_p					
								20	40	60	80	100	WATER CONTENT w					
SHEAR STRENGTH P.S.F.							UNCONFINED			FIELD VANE			QUICK TRIAXIAL			LAB VANE		
							WATER CONTENT %			10			20			30		

163.4	536.1	Ground elevation.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														</
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157.5m
 516.6
 in open
 B.H.
 Feb. 28/72

7 37 53 3

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 14

COORDS: N 4839 586, E 296 061

JOB 72-1101b

LOCATION 15,577,505 N. 971,330 E.

ORIGINATED BY V.K.

W.P. 404-65

BORING DATE Feb. 11, 1972

COMPILED BY P.S.P.

DATUM: geodetic

BOREHOLE TYPE Penn. Brk.

CHECKED BY

SOIL PROFILE				SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT — w_L			BULK DENSITY γ P.C.F.	REMARKS	
ELEV. DEPTH (m)	ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS / FOOT		BLOWS / FOOT				PLASTIC LIMIT — w_p					WATER CONTENT — w
								20	40	60	80	100	WATER CONTENT % w_p — w — w_L				
SHEAR STRENGTH P.S.F.								• UNCONFINED + FIELD VANE • QUICK TRIAXIAL x LAB VANE									
						</											

METRIC UNITS

2 24 50 27.4
El. 521.0
in open B.H.
Feb. 28/72

RECORD OF BOREHOLE No 4

1 OF 1

METRIC

W.P. 615-89-00

LOCATION Coords.: N 4 839 786 E 295 997

ORIGINATED BY LO

DIST 8 HWY 427

BOREHOLE TYPE Hollow Stem Auger

COMPILED BY LO

DATUM Geodetic

DATE 1994 08 10

CHECKED BY BB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100	W _p	W	W _L		
188.7	Ground Surface																
0.0	CLAYEY SILT Trace to some Gravel Some Sand Stiff		1	SS	13												
			2	SS	13												
			3	SS	12												
			4	SS	17												
			5	SS	14												
			6	SS	18												
			7	SS	19												
160.5	(FILL MATERIAL)		8	SS	28												
5.9	CLAYEY SILT Trace to some Gravel Some Sand Very Stiff to Hard (GLACIAL TILL) Brown Grey		9	SS	30												
			10	SS	30												
			11	SS	45												
154.1			12	SS	19												
12.6	End of Borehole																

+3, x5: Numbers refer to
Sensitivity

20
15-5 (%) STRAIN AT FAILURE
10

DEPARTMENT OF HIGHWAYS- ONTARIO
MATERIALS & TESTING OFFICE

JOB 72-31001

W.P. 280 - 65

DATUM Geodetic

RECORD OF BOREHOLE No. 7

FOUNDATION SECTION

Co-ords: N 4 839 936, E 295 936
Co-ords, 15, 879, 051, N; 970, 920 E.

LOCATION

BORING DATE Feb. 3, 1972

ORIGINATED BY VK

COMPILED BY TST

CHECKED BY CR.

BOREHOLE TYPE

SOIL PROFILE

ELEV. DEPTH	DESCRIPTION	STRAT. PROF
510.8	Ground Level	
0.0		

SAMPLES	TYPE	NUMBER	BLOWS / FOOT
1	SS	8	
2	SS	11	
3	SS	11	
4	SS	21	
5	SS	24	
6	SS	25	
7	SS	24	
8	SS	20	
9	SS	10176"	180
10	SS	6376"	
11	SS	10971"	170

DYNAMIC PENETRATION RESISTANCE
BLOWS / FOOT

SHEAR STRENGTH P.S.F.

○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL x LAB. VANE

LIQUID LIMIT — WL
PLASTIC LIMIT — WP
WATER CONTENT — W

WATER CONTENT %

BULK DENSITY

REMARKS

P.C.F. GR. SA. SI. CL.
153.8 m =
504.5 ft
2F 29 35 15

34 24 31 12

METRIC UNITS

143.0
12.7

469.3
41.5

End of Borehole
Probably Bedrock

with shale frag.

Stiff to Hard

Glacial Till

silt and sand

Het. mix. of clayey

Sand & Gravel

Ground Level

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

JOB 72-1106h

W.P. 280 - 65

DATUM Gendetic

LOCATION

BORING DATE Feb. 1, 1972

BOREHOLE TYPE Auger, BTL Core

RECORD OF BOREHOLE No. 12

Co-ORDS N 4839 961, E 275 924
Corner 15, 879, 138 N: 410, 884 E

FOUNDATION SECTION

ORIGINATED BY VK

COMPILED BY TST

CHECKED BY S.

SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT — W _L PLASTIC LIMIT — W _P WATER CONTENT — W _c			BULK DENSITY Y P.C.F.	REMARKS
ELEV. DEPTH (m)	ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	SHEAR STRENGTH P.S.F.	WATER CONTENT %				
155.6	510.5	Ground Level											
0.0	0.0												
		Het. mix. of clayey silt		1	SS	0							0 29 57 11
		sand and gravel		2	SS	37							505.0
				3	SS	45							(M) 154.0
		Glacial Till		4	SS	10	500						
		Stiff to Hard		5	SS	13							
				6	SS	46							
		Sand and Gravel		7	SS	52	400						21 33 32 11
				8	SS	132							
				9	SS	100	480						
				10	SS	100							
				11	SS	100	470						
				12	SS	100							
140.4	160.5			13	SS	100	460						
15.2	50.0	Weathered		14	EX	PR							
		shale bedrock											
137.3	450.5	sound		15	RC	POX							
18.3	60.0	End of Borehole					15						

20
10-5 % STRAIN AT FAILURE
10

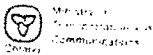
RECORD OF BOREHOLE No 5

1 OF 1

METRIC

W.P. 615-89-00 LOCATION Coords.: N 4 840 151. E 295 829 ORIGINATED BY LO
 DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Auger COMPILED BY LO
 DATUM Geodetic DATE 1994 08 10 CHECKED BY BB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
171.8	Ground Surface																
0.0																	
			1	SS	19												
	Layer of Sand		2	SS	18		170										
			3	SS	7												
			4	SS	13												
			5	SS	15		168										
	CLAYEY SILT Traces of Gravel Some Sand Stiff to Hard		6	SS	37												
			7	SS	11												
8.1			8	SS	14		166										
			9	SS	18												
			10	SS	24		164										
161.7	(FILL MATERIAL)																
10.1	CLAYEY SILT Trace to some Gravel Some Sand Hard to Very Stiff (GLACIAL TILL) Brown Grey		11	SS	80		162										
159.2			12	SS	23		160										
12.6	End of Borehole																



RECORD OF BOREHOLE No 4

METRIC

W P 48-71-22 LOCATION Sta. 406 + 50; o/s 26.0' Lt. (Imperial Chainage)
DIST 5 HWY 427/409 BOREHOLE TYPE Cone Test, Solid Stem Auger ORIGINATED BY TS
DATUM Geodetic DATE 88 03 29 COMPILED BY TS
CHECKED BY

OFFICE REPORT ON SOIL EXPLORATION

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y KN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
(feet)	ELEV DEPTH (m)	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES	20 40 60 80 100	SHEAR STRENGTH ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE			
567.6	173.0	Ground Surface											
0.0	0.0	Irregular Mixture of Clayey Silt, Some Sand, Trace Gravel (Fill)		1	SS	40							
		Some Organics		2	SS	12						20.2	14 14 40.32
				3	SS	10							
				4	SS	22							
		Brown/Grey Stiff to Very Stiff		5	SS	20							
537.6	163.9												
30.0	9.1	Het. Mixture of Clayey Silt, Sand and Gravel (Glacial Till)		6	SS	37							
				7	SS	71							
526.1	160.4												
41.5	12.6	Brown Grey		8	SS	31						22.6	
		End of Borehole											

+3, x5: Numbers refer to
Sensitivity

20
15 \diamond 5 (%) STRAIN AT FAILURE
10

DESIGN SERVICES BRANCH

FOUNDATIONS OFFICE

RECORD OF BOREHOLE No 10

Co-ords: N 4840 425, E 295 701

JOB 77-11022

LOCATION Co-ord's 880, 601 N. 970, 150 E.

ORIGINATED BY V.K.

W.P. 213-65

BORING DATE March 3, 1972

COMPILED BY V.K.

DATUM Geodetic

BOREHOLE TYPE Auger and Sample with C.H.F. Machine.

CHECKED BY

METRIC UNITS

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT		BULK DENSITY	REMARKS
ELEV. DEPTH (m)	ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FOOT	20	40	60	80	100		
165.9	544.3	Ground level.												
0.0	0.0	Het. mix. of clayey silt, sand and grav. Glacial Till.		1	SS		33							
				2	SG		18							
162.5	533.3	Brown Grey		3	SS		50							
3.4	11.0	Stiff to hard.		4	SS		13							
				5	SS		12							
				6	SS		21							
				7	SS		15							
				8	SS		42							
				9	SS		18							
155.5	510.3	Silty sand, trace of cl. & gra. Compact.		10	SS		23							
11.4	34.0			11	SS		100/5"							
154.3	506.3	Het. mix. of clayey silt, sand & gravel. hard.		12	SS		22							
11.6	38.0			13	SS		160/5"							
		Fragments of shale		14	SS		100/5"							
144.5	474.2	End of borehole.												
21.4	70.1													

20
15 \diamond 5 % STRAIN AT FAILURE
10

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 7

FOUNDATIONS OFFICE

JOB 72-11023

LOCATION

Co-ords: N4840593, E 298629
Co-ords. 881,210 N; 969,913 E.

W.P. 20-60-00 48-71-22

BORING DATE

Nov. 8, 1972

ORIGINATED BY VK

DATUM Geodetic

BOREHOLE TYPE

Auger & sample with CME Machine

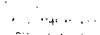
COMPILED BY VK

CHECKED BY *SK*

SOIL PROFILE		SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT w_L		BULK DENSITY	REMARKS
ELEV. DEPTH	ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT	BLOWS / FOOT 20 40 60 80 100	PLASTIC LIMIT w_p	WATER CONTENT w		
165.3	542.3	Ground Level									
0.0	0.0										
		Brown Grey		1	SS	13					
				2	SS	17					
				3	SS	35					
				4	SS	33					
		Heterogeneous mixture of clayey silt, sand and gravel.		5	SS	20					
		(Glacial Till)		6	SS	22					
		Stiff to Hard		7	SS	25					
				8	SS	13					
				9	SS	12					
151.0	505.3										
11.3	37.0	Silty sand with few gravel.		10	SS	180					
152.2	499.3	Very Dense									
13.1	43.0										
				11	SS	36					
146.7	481.3										
18.6	61.0	Bedrock		12	SS	185					
		Weathered Shale									
141.0	472.3										
143.2	469.8	Sound Shale		13	EXL	90%					
22.1	72.5	End of Borehole									

METRIC UNITS

534.3
162.9m



METRIC

ORIGINATED BY _____

COMPILED BY TS

CHECKED BY ...

OFFICE REPORT ON SOIL EXPLORATION

* 3, x 5: Numbers refer to Sensitivity

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 17

FOUNDATIONS OFFICE

JOB 72-11017

LOCATION 15,877,430 N. 971,755 E.

ORIGINATED BY H.S.

WP 401-65

BORING DATE Jan. 21 & Feb. 1, 1972

COMPILED BY T.S.T.

DATUM Geodetic

BOREHOLE TYPE Penn Drill & Cone Penetration

CHECKED BY *LS*

SOIL PROFILE			SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT — w_L PLASTIC LIMIT — w_p WATER CONTENT — w w_p — w — w_L	BULK DENSITY γ P.C.F.	REMARKS
ELEV DEPTH (3)	DESCRIPTION	STRAT. PLT	NUMBER TYPE BLOWS/FOOT						
159.7	524.0	Ground elevation.							
		Het. mix. of clayey silt, with sand and gravel.							
		Glacial Till.							
		Brown							
		Grey							
			1	SS 10	520				
			2	SS 11					
			3	SS 38					
			4	SS 32					
			5	SS 52	510				
			6	SS 45					
			7	SS 59					
			8	SS 82	500				
			9	SS 100 1/2"					
149.0	489.0		10	SS 100 1/2"	490				
147.1	482.5	Silt to sandy silt. Very dense. Grey	11	SS 67					
146.1	479.3								
13.6	44.7	End of borehole. Probable bedrock							
					470				
					460				

METRIC UNITS

158.7 m

 El. 520.6 =
 in open
 26.50 24
 Feb. 18/72

0 25 65 10

 20
 15 \diamond 5 % STRAIN AT FAILURE
 10

ORIGINATED BY V.K.

COMPILED BY T.S.T.

CHECKED BY _____

METRIC UNITS

20
15 \diamond 5 % STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 6

1 OF 1

METRIC

W.P. 815-89-00 LOCATION Coords: N 4 840 964, E 295 487 ORIGINATED BY LO
 DIST 8 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY LO
 DATUM Geodetic DATE 1994 08 11 CHECKED BY BB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100	W _p	W	W _L		
168.7	Ground Surface																
0.0	CLAYEY SILT Trace Gravel Some Sand Silt		1	SS	15												
168.9	(FILL MATERIAL)		2	SS	11												
1.8			3	SS	14												
			4	SS	21												
	Brown		5	SS	29												
	Grey		6	SS	15												
	CLAYEY SILT TO SILT Trace to some Gravel Trace to some Sand Firm to Hard (GLACIAL TILL)		7	SS	11												
			8	SS	11												
			9	SS	6												
			10	SS	25												
158.3			11	SS	40												
10.4	End of Borehole																

RECORD OF BOREHOLE No 7

1 OF 1

METRIC

W.P. 815-89-00 LOCATION Coor. N 4 841 287, E 295 339 ORIGINATED BY LQ
 DIST 6 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY LQ
 DATUM Geodetic DATE 1994 08 11 CHECKED BY BB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT 7 KN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100	W _p	W	W _L		
166.3	Ground Surface																
0.0	CLAYEY SILT Trace Gravel Some Sand Firm to Stiff		1	SS	4												
164.2	(FILL MATERIAL)		2	SS	9												
2.1			3	SS	29												
	Brown		4	SS	30												
	Grey		5	SS	16												
	CLAYEY SILT TO SILT Trace Gravel Trace to some Sand Stiff to Hard (GLACIAL TILL)		6	SS	14												
	Silty Sand Seams		7	SS	13												
			8	SS	16												
			9	SS	34												
156.7			10	SS	34												
9.6	End of Borehole																

RECORD OF BOREHOLE No 8

1 OF 1

METRIC


W.P. 615-89-00 LOCATION Coords.: N 4 841 472 E 295 251 ORIGINATED BY LO
DIST 6 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY LO
DATUM Geodetic DATE 1994 08 11/12 CHECKED BY BB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH kPa							WATER CONTENT (%)			
								20 40 60 80 100										
165.5	Ground Surface																	
0.0	CLAYEY SILT Trace Gravel Some Sand Trace Organics																	
164.1	(FILL MATERIAL)		1	SS	23													
1.4			2	SS	21													
	Gray Brown		3	SS	15													
	CLAYEY SILT Trace Gravel Trace to some Sand Stiff to Hard (GLACIAL TILL)		4	SS	11													
			5	SS	8													
	Silty Sand		6	SS	12													
			7	SS	16													
			8	SS	27													
157.7			9	SS	40													
7.8	SILTY SAND TO SAND Traces to Clay Compact																	
155.9			10	SS	26													
9.6	End of Borehole																	

RECORD OF BOREHOLE No 9

1 OF 1 METRIC

W.P. 815-89-00 LOCATION Coords.: N 4 841 589, E 295 169 ORIGINATED BY LO
DIST 8 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY LO
DATUM Geodetic DATE 1994 08 12 CHECKED BY BB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ KN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100	W _p	W	W _L		
164.6	Ground Surface																
0.0	CLAYEY SILT Traces to some Gravel Traces to some Sand Stiff to Hard (GLACIAL TILL)		1	SS	10												
			2	SS	7												
			3	SS	11												
	Searns of Silty Sand		4	SS	11												
			5	SS	23												
			6	SS	24												
			7	SS	24												
			8	SS	60												
157.5																	
7.1	SANDY SILT Traces of Clay Dense to Compact			9	SS	29											
155.0			10	SS	12												
9.6	End of Borehole																

COORDS: N 4841 828, E 295 134

LOCATIONS: 5,885,263 N; 968,288 E.

BORING DATE March 8, 1972

BOREHOLE TYPE Auger & sample with C.M.E.

ORIGINATED BY VK

COMPILED BY VK

CHECKED BY

15 \diamond 5 % STRAIN AT FAILURE

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 7

FOUNDATIONS OFFICE

JOB 72-1-024

LOCATION

Co-ords: N 4841846, E 295053
Co-ords. 5,885,320 N; 968,022 E.

W.P. 126-60

BORING DATE March 13, 1972

ORIGINATED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger & sample with C.H.E.

COMPILED BY VK

CHECKED BY

METRIC UNITS

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — w_L		BULK DENSITY	REMARKS			
ELEV. DEPTH (m)	ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE		BLOWS/FOOT	BLOWS / FOOT	20	40			60	80	100
							SHEAR STRENGTH P.S.F.		WATER CONTENT %		Y		P.C.F.	GR.SA.SI.CL.	
							O UNCONFINED + FIELD VANE		W _p — W — W _L						
							● QUICK TRIAXIAL × LAB VANE		15 30 45						
							400 800 1200 1600 2000								
0.0	0.0	Het. mix. of clayey silt, sand & gravel.		1	SS	40									548.6 ft
				2	SS	65									2 19 69 10
				3	SS	32									
164.0	538.2	Brown Grey		4	SS	30									
4.0	13.0	Glacial Till		5	SS	11									0 10 33 57
		Firm to Hard		6	TW	PM									
				7	TW	PM									
				8	S	47									0 18 51 3
				9	SS	66									13 83 (4)
				10	SS	41									
155.0	508.6			11	SS	23									
12.0	42.5	Silty sand to sandy silt, with some clay & occ. gravel.		12	SS	13									
		Compact to Very Dense		13	SS	13									0 42 48 10
				14	SS	58									
145.9	478.6			15	SS	147									
22.1	72.5	Het. mix. of clayey silt with sand & gravel (Glacial Till) (shale fragments throughout)		16	SS	100.5"									
142.5	467.6	Hard													
25.5	83.5	Shale Bedrock													
141.3	463.6	Sound		17	BXL	90%									
26.7	87.5	End of Borehole													

20
15 5 % STRAIN AT FAILURE
10

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 5

FOUNDATIONS OFFICE

JOB 72-1102h

LOCATION

Co-ords: N 4 841 866, E 295 119

W.P. 126-60

BORING DATE

March 7, 1972

ORIGINATED BY VK

DATUM Gendetic

BOREHOLE TYPE

Auger & sample with C.M.E.

COMPILED BY VK

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT			BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		BLOWS / FOOT					PLASTIC LIMIT				
							20	40	60	80	100	W _p	W _L	W _c		
551.8	Ground Level						SHEAR STRENGTH P.S.F.					WATER CONTENT %				
							○ UNCONFINED + FIELD VANE					W _p — W _L — W _c				
							● QUICK TRIAXIAL × LAB VANE					WATER CONTENT %				
0.0	Met. mix. of clayey silt with sand and gravel.					550						15 30 45			γ	P.C.F. GR. SA. SI. CL.
			1	SS	36											
			2	SS	37											
			3	SS	38											
538.8	Brown Grey		4	SS	21	540										
13.0			5	SS	29											
	Glacial Till		6	SS	12											
	Stiff to Hard		7	SS	81	530									139	
			8	SS	51											
			9	SS	120	520										
			10	SS	94											
			11	SS	36	510										
			12	SS	17											
500.3			13	TW	PM											
51.5	Silty sand to sandy silt, with some clay and occ. gravel		14	SS	30	500									131	
			15	SS	61	490										
	Dense to Very Dense		16	SS	170	480										
79.8			17	SS	100	470										
72.0	Met. mix. of clayey silt, sand and gravel. (Glacial Till)															
	shale fragments below el. 474.4 - 474.5 m															
68.8	Hard															
63.0	Shale Bedrock		18	BYT	80%	470										
61.8	Sound		19	BXL	80%											
58.0	End of Borehole															

METRIC UNITS

RECORD OF BOREHOLE No 10

1 OF 1

METRIC

W.P. 615-89-00 LOCATION Coords.: N 4 842 042 E 295 018 ORIGINATED BY LO
DIST 8 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY LO
DATUM Geodetic DATE 1994 08 12 CHECKED BY BB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
163.1	Ground Surface																
0.0	CLAYEY SILT					*											
0.3	Trace Gravel																
	Some Sand																
	Stiff																
162.0	(GLACIAL TILL)		1	SS	9		162										
1.1	SILTY SAND TO SANDY SILT																
	Trace of Clay		2	SS	22												
	Compact																
160.2			3	SS	13												
2.9	SAND						160										
	Poorly Graded		4	SS	10												
	Trace of Fines																
	Loose																
159.4																	
3.7	CLAYEY SILT		5	SS	19												
	Trace to some Gravel																
	Some Sand		6	SS	26												
	Stiff to Hard																
	(GLACIAL TILL)		7	SS	27		158										
			8	SS	35												
							158										
			9	SS	48												
							154										
153.5			10	SS	11												
9.6	End of Borehole																
	* Water Level Not Established Due to the Walls Caving at 12 Feet.																

RECORD OF BOREHOLE No 11

1 OF 1

METRIC

W.P. 615-89-00 LOCATION Coords.: N 4 842 341, E 294 896 ORIGINATED BY T.G.
DIST 6 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY L.O.
DATUM Geodetic DATE 1994 08 15 CHECKED BY B.B.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
162.1	Ground Surface																
0.0	CLAYEY SILT TO SILT Traces of Sand Very Stiff		1	SS	23												
160.7																	
1.4	SILTY SAND TO SAND Traces of fines Dense to Very Dense		2	SS	37												
159.6																	
2.5	CLAYEY SILT TO SILT Traces of Sand Hard		3	SS	52												
158.1																	
4.0	SAND - Poorly Graded, Traces of Fines, Very Dense		4	SS	43												
157.7																	
4.4	CLAYEY SILT Trace of Gravel Some Sand Hard to Very Stiff (GLACIAL TILL)		5	SS	61												
			6	SS	30												
			7	SS	89												
			8	SS	67												
			9	SS	29												
153.5																	
8.6	SANDY SILT Trace Gravel Trace Sand Occasional Seams of Sand Dense																
152.5			10	SS	45												
9.6	End of Borehole																

+3, x5: Numbers refer to
Sensitivity

20
15-5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 12

1 OF 1

METRIC

W.P. 815-89-00 LOCATION Coords: N 4 842 571, E 294 803 ORIGINATED BY L.O.
DIST 6 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY L.O.
DATUM Geodetic DATE 1994 05 19 CHECKED BY B.B.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
161.4	Ground Surface																
0.0	SANDY SILT Some Clay Very Stiff																
180.4			1	SS	24												
1.0	CLAYEY SILT TO SILT Some Sand Very Stiff to Hard (GLACIAL TILL)		2	SS	25												
			3	SS	19												
			4	SS	22												
	Some Gravel		5	SS	100	/30cm											
			6	SS	102	/25cm											
156.1			7	SS	100	/28cm											
5.3	SANDY SILT Trace to some Gravel Very Dense		8	SS	88												
154.3																	
7.1	SAND TO GRAVELLY SAND Traces of fines Very Dense		9	SS	77												
152.1																	
9.3	End of Borehole																

+3, x3: Numbers refer to
Sensitivity

20
15-5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 2

1 OF 1

METRIC

W.P. 804-89-00 FORMERLY 49-71-02 LOCATION Coords: N 4 842 634.4, E 294 775.1

ORIGINATED BY BRL

DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Auger

COMPILED BY BRL

DATUM Geodetic DATE 79/07/09

CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT 7 kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100	20 40 60 80 100	W _p W W _L	10 20 30			
162.9	Ground Surface													
0.0	Glacial Till, Grey Very Stiff						162							
161.7														
1.2	Silt, Grey, Compact to Dense With Occasional Thin Clay Layers		1	SS	20									0 49 49 2
	Cloey Silt		2	SS	35		160							
158.3														
4.6	Glacial Till Heterogeneous Mixture of Silt, Sand, Clay and Gravel Very Dense		3	SS	60	/13cm	158							6 35 49 10
			4	SS	60	/10cm								
			5	SS	70		156							
			6	SS	60	/10cm	154							23 48 29 0
	Shale Fragments		7	SS	111	/23cm	152							
151.0														
150.6	Weathered Shale		8	SS	80	/15cm								
12.3	End of Borehole													
	Note: Borehole Caved in at 1.2 m Shortly After Completion of Boring													

RECORD OF BOREHOLE No 13

1 OF 1

METRIC

W.P. 615-89-00 LOCATION Coords.: N 4 842 931, E 294 659 ORIGINATED BY T.G.
DIST 8 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY L.O.
DATUM Geodetic DATE 1994 08 15 CHECKED BY B.B.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100	W _p	W	W _L		
162.5	Ground Surface																
0.0	CLAYEY SILT TO SILT Trace Gravel Trace to some Sand Very Stiff to Hard		1	SS	58		182										
			2	SS	17												
			3	SS	122		160										
			4	SS	125												
			5	SS	149	/23cm											
			6	SS	150	/28cm	158										
157.3																	
5.2	SILTY SAND Some Gravel Some Fines Dense		7	SS	32												
156.6																	
5.9	CLAYEY SILT Traces of Gravel Some Sand Hard		8	SS	150		156										
155.4																	
7.1	BEDROCK Weathered Gray Shale Hard		9	SS	112	/8cm											
							154										
152.9			10	SS	100	/8cm											
9.6	End of Borehole																

RECORD OF BOREHOLE No 14

1 OF 1

METRIC

W.P. 815-89-00 LOCATION Coords.: N 4 843 234, E 294 581
 DIST 6 HWY 427 BOREHOLE TYPE Solid Stem Auger
 DATUM Geodetic DATE 1994 08 17
 ORIGINATED BY T.C.
 COMPILED BY L.O.
 CHECKED BY B.B.

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100	W _p	W	W _L		
163.7	Ground Surface															
0.0	CLAYEY SILT TO SILT Traces of Gravel Some Sand Hard (GLACIAL TILL)		1	SS	50											
			2	SS	129											
			3	SS	130											
			4	SS	119											
			5	SS	55											
158.5			6	SS	120	/8cm										
5.2	BEDROCK Grey Weathered Shale Hard		7	SS	55											
			8	SS	106	/23cm										
			9	SS	118	/15cm										
154.5			10	SS	128	/10cm										
9.2	End of Borehole															

+3, x5: Numbers refer to
Sensitivity

20
15-5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 15

1 OF 1

METRIC

W.P. 815-89-00 LOCATION Coords.: N 4 843 449, E 294 548 ORIGINATED BY I.C.
 DIST 8 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY L.O.
 DATUM Geodetic DATE 1994 08 17 CHECKED BY B.B.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100										WATER CONTENT (%)		
								SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE										10 20 30		
164.4	Ground Surface																			
0.0	CLAYEY SILT Trace Gravel Some Sand						164													
163.4	(GLACIAL TILL)																			
1.0	SILTY SAND TO SAND Traces of Fines Compact		1	SS	28															
162.3			2	SS	27															
2.1	BEDROCK Weathered Gray Shale Hard		3	SS	65		162													
			4	SS	103															
			5	SS	117	/28cm														
			6	SS	117	/25cm	160													
			7	SS	140	/28cm														
			8	SS	120	/13cm	158													
			9	SS	120	/10cm	156													
155.1			10	SS	128	/13cm														
9.3	End of Borehole																			

RECORD OF BOREHOLE No. 6

Co-ORDS: N 4843 579, E 294 564
 Grid: 15,891,000, F 945,400

49-21-04

COMPILED BY: BSL

DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Auger

COMPILED BY: BSL

DATUM Geodetic DATE July 11, 1979

CHECKED BY:

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH (m)	ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES	20	40	60	80	100	W _p	W	W _L		
169.7	556.7	Ground Surface														
0.0	0.0	Clay: intermediate plasticity, brown, very stiff.		1	SS	20										
100.9	547.7			2	SS	31										6 39 41 14
2.7	9.0	Glacial Till: Heterogeneous mixture of clay, silt, sand & gravel. Brown Grey, very stiff to hard		3	SS	35										14 44 31 11
				4	SS	100/5"										
				5	SS	58										5 2 47 46
		Becoming more cohesive. Containing frequent shale fragments.		6	SS	37										
				7	SS	46										
				8	SS	63										
				9	SS	107										
154.6	507.2			10	SS	116										
15.1	49.5	End of Borehole														
		Note: Hole open to 44 feet on completion.														

METRIC UNITS

RECORD OF BOREHOLE No 1

Co-ords: N 4 043 591, E 294 493

49-71-04

LOCATION Co-ords. N 15,891,045; E 966,184

ORIGINATED BY

6 HWY 427

BOREHOLE TYPE Hollow Stem Auger

COMPILED BY BPL

Geotechnical

DATE July 16, 1979

CHECKED BY

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH (m)	ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES	20	40	60	80	100		
168.8	553.8	Ground Surface					SHEAR STRENGTH						
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE						
							WATER CONTENT (%)						
							PLASTIC LIMIT W_p NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L						
							10 20 30						
0.0	0.0	Clay: low plasticity, very stiff, brown.											
166.4	545.8			1	SS	23							
2.4	8.0	Glacial Till: Heterogeneous mixture of clay, silt, sand & gravel. Hard		2	SS	65							
		Brown		3	SS	100							
		Grey		4	SS	116							
		occ. shale fragments.		5	SS	43							
		becoming more cohesive, containing frequent shale fragments.		6	SS	86							
				7	SS	100							
				8	SS	100							
154.8	507.8			9	SS	80							
14.0	46.0	End of Borehole											

METRIC UNITS

9 34 42 15
17 39 34 10

RECORD OF BOREHOLE NO. 5

Co-ords: N 4 843 605, E 294 562

49-71-04

Co-ords: N 11, 961, 581, 044, 517

BOREHOLE TYPE Hollow Stem Auger

COMPLETED BY BRJ

Condition

DATE July 11, 1979

CHECKED BY

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH (m)	ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES	20	40	60	80	100		
169.6	556.4	Ground Surface											
0.0	0.0	Clay: low to intermediate plasticity, very stiff, brown.		1	SS	21							
166.2	545.4			2	SS	25							
3.4	11.0	Glacial Till: Heterogeneous mixture of clay, silt, sand & gravel. Hard.		3	SS	44							
				4	SS	100/4"							
		silt, very dense		5	SS	165							
				6	SS	53							
				7	SS	36							
				8	SS	62							
		containing numerous shale fragments		9	SS	134							
154.5	506.9			10	SS	80							
15.1	49.5	End of Borehole											

Note:

- 1) Hole caved in at 21 feet after completion.
- 2) Refusal to augering at 46 feet.

METRIC UNITS

RECORD OF BOREHOLE No 16

1 OF 1

METRIC

W.P. 615-89-00 LOCATION Coords.: N 4 843 738 E 294 508 ORIGINATED BY T.C.
DIST 8 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY L.O.
DATUM Geodetic DATE 1984 08 17 CHECKED BY B.B.

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC UNIT W _p	NATURAL MOISTURE CONTENT W	LIQUID UNIT W _L	UNIT WEIGHT γ KN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100					
165.3	Ground Surface															
0.0	CLAYEY SILT Trace to some Gravel Some Sand Stiff		1	SS	12											
			2	SS	11											
			3	SS	8											
			4	SS	12											
160.9	(FILL MATERIAL)		5	SS	13											
4.4	CLAYEY SILT - (GLACIAL TILL) Trace Gravel Some Sand Very Stiff		6	SS	18											
160.1			7	SS	130	/23cm										
5.2	SILTY SAND Trace to some Gravel Traces of Clay Very Dense (GLACIAL TILL)		8	SS	158	/25cm										
			9	SS	129	/28cm										
158.1																
158.8	CL Si-Trace SA, Some GR - (TILL)		10	SS	121	/20cm										
9.5	End of Borehole															

Co-ords: N15,891,900; E966,035

LOCATION Co-ords: N15,891,900; E966,035

ORIGINATED BY BR.

BOREHOLE TYPE 3 1/2" Diam. RSA and Cone Test

COMPILED BY BL

DATE August 10, 1979

CHECKED BY ES

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH (m)	RIEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES	20 40 60 80 100	W _p	W		
160.9	178.0	Ground Level											
0.0	0.0	Sandy silt, dark gray to grey, compact and slightly cemented.		1	SS	22							
188.8	21.0			2	SS	8							
2.1	7.0	Glacial Till		3	SS	34							
		Silty sand, some gravel, very dense		4	SS	40							
				5	SS	1177	6"						
				6	SS	1267	6"						
				7	SS	1307	6"						
154.2	36.0			8	SS	1467	9"						
6.7	22.0	Sand with gr., v. dense		9	SS	1507							
		Silty clay, some sand, reddish, hard.		10	SS	1227	9"						
151.6	47.3			11	SS	58							
9.3	30.5	Shale bedrock, fine texture and fissile, weathered.		12	SS	1007	5"						
				13	SS	1287	10"						
				14	SS	1007	4"						
148.4	47.0			15	SS	1107	4"						
12.5	41.0	End of Borehole		16	SS	1237	6"						

RECORD OF BOREHOLE No 17

1 OF 1

METRIC

W.P. 615-89-00 LOCATION Coords.: N 4 843 984, E 294 488 ORIGINATED BY T.C.
 DIST 6 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY L.O.
 DATUM Geodetic DATE 1994 08 16 CHECKED BY B.B.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
168.1	Ground Surface																
0.0	CLAYEY SILT Trace to some Gravel Some Sand Stiff to Hard		1	SS	26												
			2	SS	26												
			3	SS	12												
			4	SS	11												
			5	SS	11												
163.7	(FILL MATERIAL)																
4.4	SILTY SAND INTERBEDDED WITH CLAYEY SILT Traces of Gravel Compact		6	SS	12												
			7	SS	24												
			8	SS	22												
161.0	(GLACIAL TILL)																
7.1	GRAVELLY SAND Traces of Fines Very Dense		9	SS	54												
158.8	SANDY SILT, Trace Gravel Trace Clay, Very Dense		10	SS	105	/25cm											
9.6	End of Borehole																

+3, x5: Numbers refer to
Sensitivity

20
15-25 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 18

1 OF 1

METRIC

W.P. 615-89-00 LOCATION Coords.: N 4 844 232 E 294 431 ORIGINATED BY T.G.
DIST 6 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY L.O.
DATUM Geodetic DATE 1984 08 18 CHECKED BY B.B.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kn/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)				
								20	40	60	80	100	10	20	30		
171.7	Ground Surface																
0.0	CLAYEY SILT Trace Gravel Some Sand Very Stiff		1	SS	26												
	(FILL MATERIAL)		2	SS	20												
169.8																	
2.1	CLAYEY SILT Trace to some Gravel Some Sand Very Stiff to Hard (GLACIAL TILL)		3	SS	23												
			4	SS	26												
			5	SS	32												
	Brown		6	SS	31												
	Gray		7	SS	27												
			8	SS	39												
			9	SS	138	/25cm											
163.1																	
8.6	SILTY SAND TO SAND Traces of Gravel Traces of Fines																
162.1			10	SS	61												
9.6	End of Borehole																

RECORD OF BOREHOLE No 19										1 OF 1		METRIC					
W.P. 615-89-00			LOCATION Coords.: N 4 844 556, E 294 384			ORIGINATED BY T.C.											
DIST 8 HWY 427			BOREHOLE TYPE Solid Stem Auger			COMPILED BY L.O.											
DATUM Geodetic			DATE 1984 08 18			CHECKED BY B.B.											
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100	W _p	W	W _L		
178.1	Ground Surface																
0.0	SANDY SILT Trace to some Gravel Some Sand Compact		1	SS	12												
174.3	(FILL MATERIAL)		2	SS	20												
1.8	CLAYEY SILT Trace to some Gravel Some Sand Stiff to Hard		3	SS	31												
			4	SS	14												
			5	SS	11												
			6	SS	18												
170.9	(FILL MATERIAL)		7	SS	28												
5.2			8	SS	31												
	Brown Grey SILT TO CLAYEY SILT Trace Gravel Trace to some Sand Very Stiff to Hard (GLACIAL TILL)		9	SS	20												
168.5			10	SS	49												
9.6	End of Borehole																



TRANSPORTATION AND
COMMUNICATIONS
COMMISSION

RECORD OF BOREHOLE No 1

METRIC

W P 153-80-02 LOCATION Co-ords. N 4 844 821.2; E 294 328.3 ORIGINATED BY V.P.
DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Augers and Cone Test COMPILED BY V.P.
DATUM Geodetic DATE 81-12-10 to 81-12-11 CHECKED BY CP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	N VALUES								
171.9 0.0	Ground Surface												
	Mottled		1	SS	9								
			2	SS	13								
			3	SS	29								
	Brown Grey		4	SS	27								
	(Glacial Till) Silty Clay with Sand trace of Gravel		5	SS	21								
			6	SS	35								
			7	SS	14								
	Stiff to Hard		8	SS	16								
			9	SS	53								
			10	SS	37								
160.0 11.9	Silty Sand Dense		11	SS	37								
158.0	Boulder		12	BC	-								
13.9	Break corebarrel in borehole Abandon hole End of Borehole												
	* Borehole caved at shallow depth. Perched water level at 0.5 metres.												

170
168
166
164
162
160

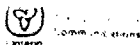
130/28 cm

2-20-45-33
3-20-57-20
0-28-42-30

3, 5: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE



RECORD OF BOREHOLE No 5

METRIC

W P 153-80-02 LOCATION Co-ords. N 4 844 920.5; E 294 356.5 ORIGINATED BY V.P.
DIST 6 HWY 427 BOREHOLE TYPE Solid Stem Auger/BW Casing and Cone Test COMPILED BY V.P.
DATUM Geodetic DATE 81-12-16 to 81-12-17 CHECKED BY [Signature]

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE								
171.5	Ground Surface											
0.0	(Glacial Till)		1	SS	12							
	Silty Clay		2	SS	15							
	Brown Gray		3	SS	37							
			4	SS	35							
	with Sand trace of Gravel		5	SS	27							
	Stiff to Hard		6	SS	15							
	Cobble		7	SS	20							
	Gravel Cobbles & Boulders		8	SS	41							
162.4			9	SS	124							
9.1	Gray Silty Sand to Sand		10	SS	77							
	Varying Amounts of Gravel		11	SS	53							
	occasional Cobbles and Boulders throughout		12	SS	145							
	Very Dense		13	SS	148/23 cm							
149.8			14	SS	147/23 cm							
21.7	End of Borehole											
	* Note: W.L. after 24 hours											
	Refusal to augering at 8.2 metres											
	Move BH 1.2 m south											
	Drive BW casing and run bi-cone 18.3 to 21.3 metres.											

* 3, * 5: Numbers refer to Sensitivity

20
15
10
* 5 (%) STRAIN AT FAILURE



RECORD OF BOREHOLE No 2

METRIC

W P 88-78-22 LOCATION Co-ords. N 4 845 140.9; E 294 264.6 ORIGINATED BY R.Z.
DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Augers COMPILED BY R.Z.
DATUM Geodetic DATE 82 05 14 CHECKED BY *SP*

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
172.1	Ground Level																
0.0	(Glacial Till)																
	Mottled Firm		1	SS	7		172										
	Silty Clay with Sand		2	SS	20												
	Trace of Gravel		3	SS	45		170										9 21 48 22
	Brown Gray		4	SS	58												
	occ. Sand Seams		5	SS	47		168										
	Very Stiff to Hard		6	SS	52												
165.7			7	SS	100/	28 cm	166										
6.4	(Glacial Till)																
	Silt to Silty Clay		8	SS	100		164										16 38 40 6
	and Sand																
	Varying amounts of																
	Gravel																
	occ. Cobbles and																
	Boulders Hard		9	SS	100/	23 cm											
162.5																	
9.6	End of Borehole																

*3, *5: Numbers refer to
Sensitivity

20
15
10
5 (% STRAIN AT FAILURE)

RECORD OF BOREHOLE No 20

1 OF 1

METRIC

W.P. 615-89-00 LOCATION Coords.: N 4 845 292, E 294 270 ORIGINATED BY L.O.
 DIST 8 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY L.O.
 DATUM Geodetic DATE 1994 08 19 CHECKED BY B.B.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100	W _p	W	W _L		
179.4	Ground Surface																
0.0	CLAYEY SILT Trace Gravel Trace to some Sand Firm to Stiff		1	SS	8												
			2	SS	18												
			3	SS	14												
			4	SS	6												
			5	SS	13												
			6	SS	12												
173.7	(FILL MATERIAL)		7	SS	15												
5.7	CLAYEY SILT Trace Gravel Trace to some Sand Suff to Hard (GLACIAL TILL)		8	SS	24												
			9	SS	83												
169.8			10	SS	50												
9.8	End of Borehole																

APPENDIX 'A'

DETAILS OF HIGH MAST LIGHTING POLES

W.P. 615-89-00
HWY 427 ILLUMINATION
FROM NORTH OF FASKEN DR.
TO SOUTH OF STEELES

HML POLE NO.	HWY 427 STATION	OFFSET FROM CL (m)	SIDE	EXISTING ELEVATION	PROP. FINAL ELEV. AT TOP OF FOOTING	POLE HEIGHT (m)
P1	10+405.0	CL		168.64	169.94	30
P2	10+579.5	CL		166.57	168.53	30
P3	10+749.0	CL		165.28	167.17	30
P4	10+912.5	CL		164.51	166.09	30
P5	11+071.0	CL		164.51	166.27	35
P6	11+149.0	129	EAST	164.78	164.75	35
P7	11+228.0	59	EAST	160.46	160.50	40
P8	11+244.5	80	WEST	159.60	159.50	35
P9	11+265.0	160.3	EAST	159.74	159.84	35
P10	11+311.8	176	WEST	161.40	161.75	35
P11	11+341.0	65.5	EAST	161.90	162.19	40
P12	11+383.0	61.5	WEST	165.26	165.39	40
P13	11+506.0	92	WEST	171.16	171.00	30
P14	11+501.0	CL		167.68	169.33	35
P15	11+637.5	36.5	WEST	168.55	168.20	35
P16	11+761.0	CL		169.96	171.13	35
P17	11+895.5	CL		170.54	171.89	35
P18	12+042.0	CL		171.81	173.08	35
P19	12+191.0	CL		172.44	174.10	30
P20	12+352.0	CL		173.09	174.55	30
P21	12+519.0	CL		172.05	174.11	30
P22	12+684.0	CL		170.91	172.72	30
P23	12+849.0	CL		169.49	171.13	30
P24	13+013.5	CL		167.96	169.55	30
P25	13+178.0	CL		166.66	168.23	30
P26	13+339.5	CL		165.91	167.46	30

Note:

Pole elevation at centre median is top of median barrier wall.

W.P. 615-89-00
 HWY 427 ILLUMINATION
 FROM NORTH OF FASKEN DR.
 TO SOUTH OF STEELES

HML POLE NO.	HWY 427 STATION	OFFSET FROM CL (m)	SIDE	EXISTING ELEVATION	PROP. FINAL ELEV. AT TOP OF FOOTING	POLE HEIGHT (m)
P27	13+484.0	CL		165.51	166.93	30
P28	13+626.5	CL		164.76	166.48	35
P29	13+713.5	69	EAST	165.52	165.52	30
P30	13+778.0	CL		164.32	165.97	35
P31	13+845.0	85	EAST	168.83	168.50	40
P32	13+914.0	78.5	WEST	168.64	169.00	40
P33	14+003.5	CL		163.39	165.19	35
P34	14+054.0	65.0	WEST	165.81	165.81	30
P35	14+178.0	CL		162.87	164.58	35
P36	14+337.5	CL		162.40	164.02	30
P37	14+504.0	CL		161.88	163.46	30
P38	14+670.0	CL		161.38	163.16	30
P39	14+803.0	CL		161.84	163.53	30
P40	14+972.0	CL		162.27	164.23	30
P41	15+139.0	CL		162.79	165.03	30
P42	15+290.0	CL		163.27	165.56	30
P43	15+453.0	CL		164.09	165.92	35
P44	15+582.0	66.4	EAST	166.72	166.72	30
P45	15+613.0	CL		164.51	166.35	35
P46	15+702.0	79.5	EAST	169.82	170.25	40
P47	15+751.5	68.3	WEST	169.68	170.00	40
P48	15+818.0	CL		165.26	167.09	35
P49	15+879.0	84.5	WEST	166.30	166.00	30
P50	15+971.0	CL		165.34	167.99	35
P51	16+130.0	CL		168.07	169.83	35
P52	16+299.0	CL		170.50	172.24	30
P53	16+639.0	CL		172.94	174.52	30
P54	16+803.0	CL		175.07	176.86	30
P55	16+967.0	CL		177.09	179.18	30
P56	17+131.0	CL		179.40	181.38	30
P57	17+275.0	2.5	WEST	180.47	181.07	35
P58	17+455.0	2.5	WEST	179.61	180.33	40
P59	17+630.0	2.5	WEST	179.44	179.93	40

Note:

Pole elevation at centre median is top of median barrier wall.

APPENDIX 'B'

NSSP FOR HIGH MAST LIGHTING POLES CONSTRUCTION

(AN EXAMPLE FROM ANOTHER REPORT)

NON-STANDARD SPECIAL PROVISION

Sheet _____ of _____

DATE _____

WP NO 368-87-00 CONTRACT NO _____ DISTRICT NO 6 HWY NO 407

LOCATION 407/427 Interchange TYPE OF WORK _____

1. This S P is new (✓) ☐

This S P replaces No N/A

Remarks:

Explanation of Intent:

To define High Mast Pole foundation construction

2. Item No	Spec No	Title or Item Description
45	631	CONCRETE FOOTING FOR HIGH MAST POLES

CONSTRUCTION

The Contractor is advised that variable types of subsurface material may be encountered at the high mast light pole locations; for additional information regarding soil conditions the Contractor is referred to the Foundation Investigation Report.

For bidding purposes it may be assumed that:

- Ground water is at or near the surface.
- If cohesionless material is encountered, it would be susceptible to disturbance under conditions of unbalanced hydrostatic head.
- If glacial deposits are encountered, there is a probability that occasional cobbles and boulders may be encountered within the deposit.

The Contractor is responsible for constructing the high mast pole foundations without disturbing the material at the sides or bases of the foundations. The Contractor shall submit eight copies of the proposed construction method to the Engineer for review a minimum of 15 working days prior to the commencement of construction of these foundation elements.

BASIS OF PAYMENT

Payment at the contract price for the above tender item shall be full compensation for all labour, equipment and materials required to do the work.

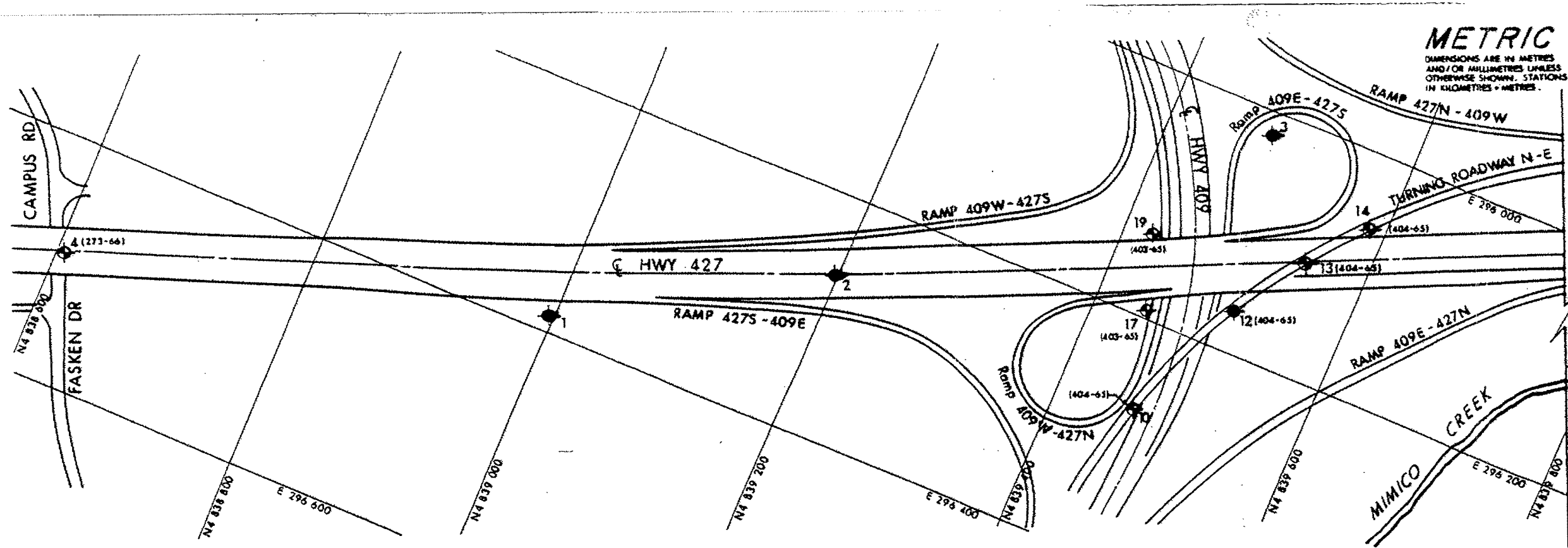
3. Structural Section

D. Wong

Initiated by

Detailed by

Approved by

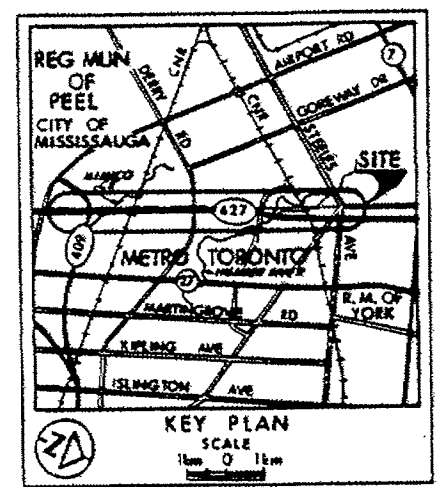


CONT No
WP No 615-89-00

HIGH MAST LIGHTING
HWY 427 FROM CAMPUS RD
FASKEN DR TO STEELES AVE

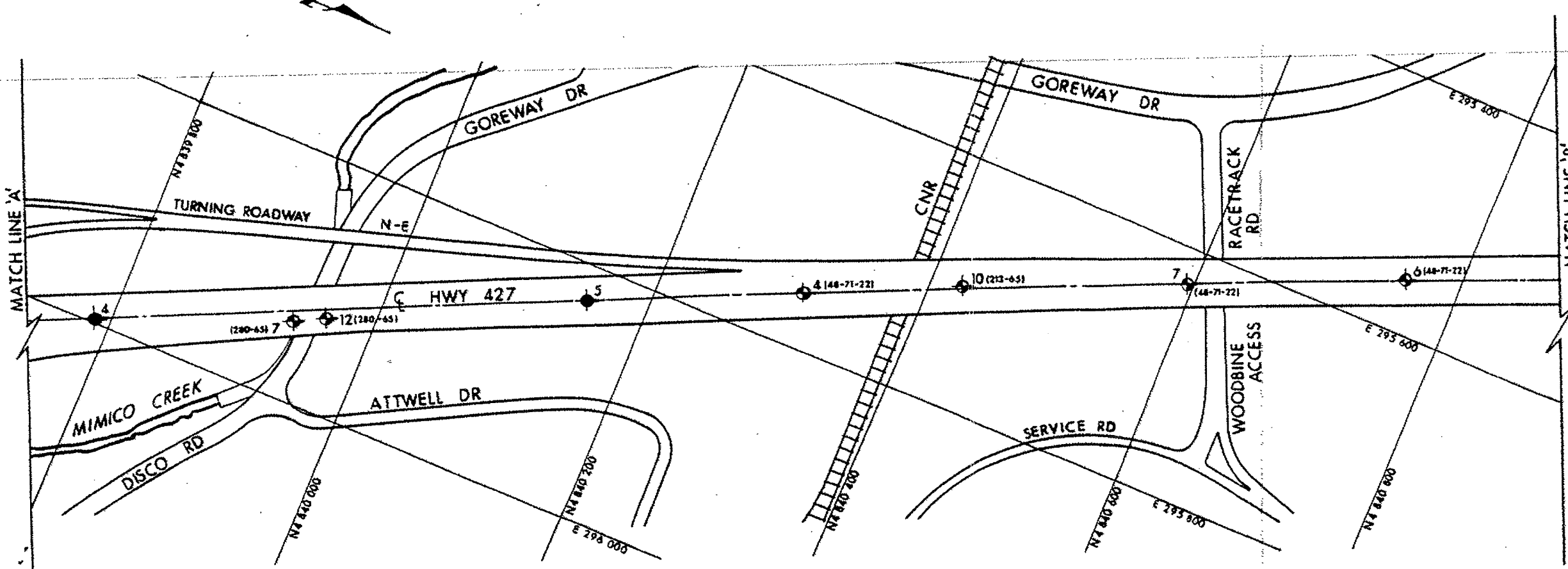
SHEET

BORE HOLE LOCATIONS & SOIL STRATA



- LEGEND**
- Bore Hole
 - ⊕ Dynamic Cone Penetration Test (Cone)
 - ⊗ Bore Hole & Cone
 - N Blows/0.3m (Std Pen Test, 475 J/blow)
 - CONE Blows/0.3m (60° Cone, 475 J/blow)
 - ✚ Wt at time of investigation
1972 01, 1972 02, 1972 03, 1972 11,
1988 03 & 1994 08

No	ELEVATION	CO-ORDINATES NORTH	EAST
1	165.9	4 838 993	296 386
2	164.5	4 839 198	296 265
3	163.0	4 839 483	296 019
4	166.7	4 839 786	295 997
5	171.8	4 840 151	295 829
6	167.4	4 838 605	296 492
7	159.7	4 839 441	296 191
17	161.3	4 839 425	296 133
10	160.3	4 839 462	296 279
12	163.4	4 839 511	296 165
13	163.6	4 839 549	296 106
14	161.1	4 839 586	296 061
7	155.7	4 839 936	295 936
12	155.6	4 839 961	295 924
4	173.0	4 840 310	295 733
6	171.1	4 840 755	295 558
7	165.3	4 840 593	295 629
10	165.9	4 840 425	295 701



NOTE
For Soil details refer to
Record of Borehole Sheets

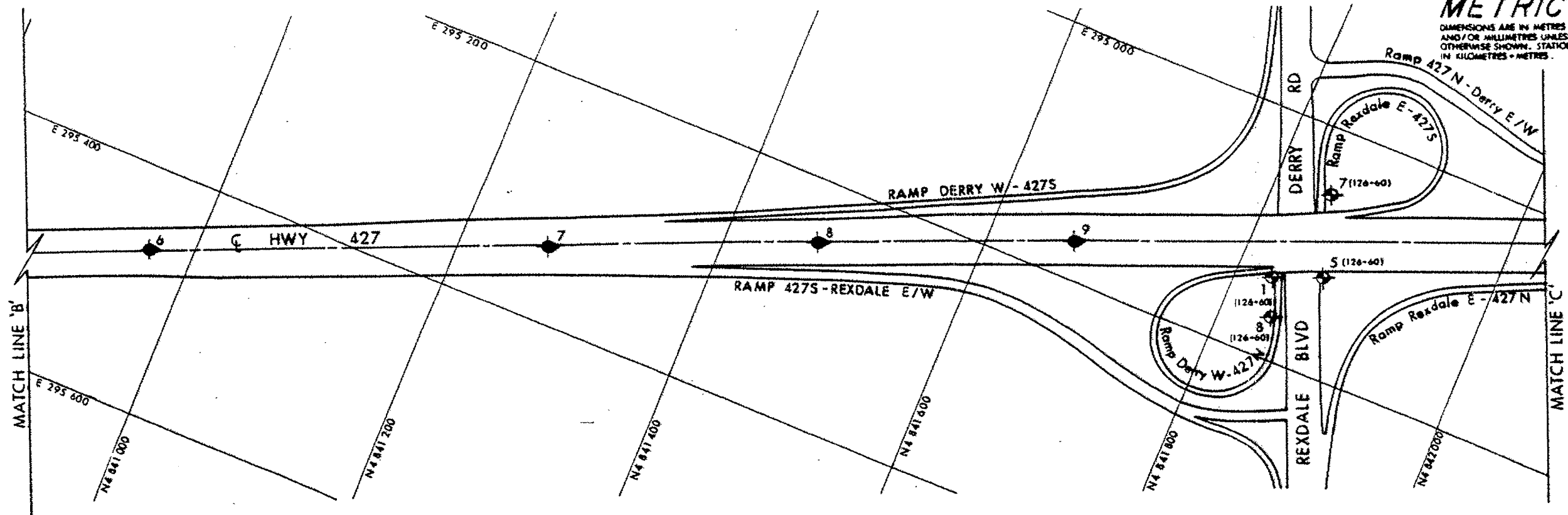
NOTE
The boundaries between soil strata have been established
only at Bore Hole locations. Between Bore Holes the
boundaries are assumed from geological evidence.

NOTE: The complete foundation investigation and design report for
this project and other related documents may be examined at the
Engineering Materials Office, Department of Information Services,
this report and related documents is specifically excluded in
accordance with the conditions of Section GC 2.01 of O.P.S. Gen Cond.


REV.	DATE	BY	DESCRIPTION
1			

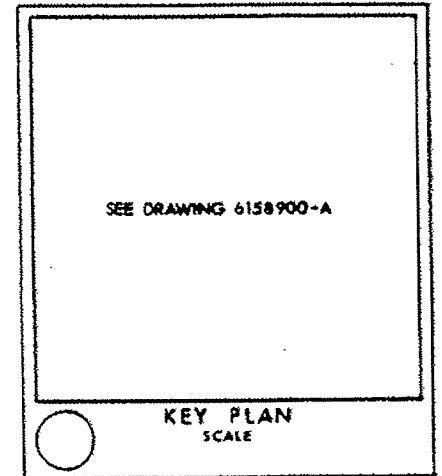
Geocres No 30M12-224

HWY No 427	DIST 6
SUBMITED BY [CHECKED BY]	DATE 1994 11 17
DRAWN BY [CHECKED BY]	SITE
	DWG 6158900-A



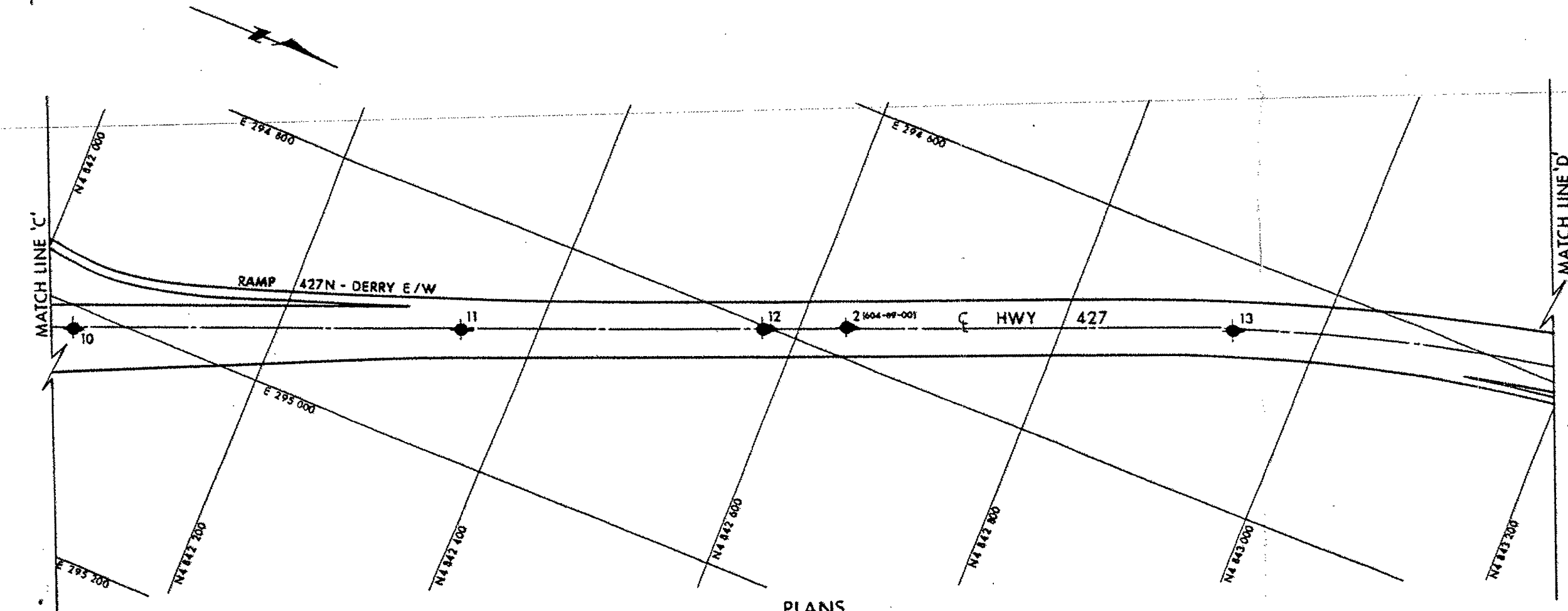
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES UNLESS
OTHERWISE SHOWN. STATIONS
IN KILOMETRES + METRES.

CONT No WP No 615-89-00		 SHEET
HIGH MAST LIGHTING HWY 427 FROM CAMPUS RD/ FASKEN DR TO STEELES AVE		
BORE HOLE LOCATIONS & SOIL STRATA		



LEGEND	
◆	Bore Hole
⊕	Dynamic Cone Penetration Test (Cone)
◆	Bore Hole & Cone
N	Blows/0.3m (Std Pen Test, 475 l/blow)
CONE	Blows/0.3m (60° Cone, 475 l/blow)
✦	WE at time of investigation 1972 03, 1973 02, 1979 07 & 1994 08

No	ELEVATION	CO-ORDINATES	
		NORTH	EAST
6	168.7	4 840 964	295 467
7	166.3	4 841 267	295 339
8	165.5	4 841 472	295 251
9	164.6	4 841 669	295 169
10	163.1	4 842 042	295 018
11	162.1	4 842 341	294 896
12	161.4	4 842 571	294 803
13	162.5	4 842 931	294 659
1	168.4	4 841 828	295 134
5	168.2	4 841 866	295 119
7	168.0	4 841 846	295 053
8	168.1	4 841 840	295 165
2	162.9	4 842 634	294 775



PLANS
SCALE
40m 0 40m

NOTE
For Soil details refer to
Record of Borehole Sheets

NOTE
The boundaries between soil strata have been established
only at Bore Hole locations. Between Bore Holes the
boundaries are assumed from geological evidence.

NOTE The complete foundation investigation and design report for
this project and other related documents may be examined at the
Engineering Materials Office Downtown. Information contained in
this report and related documents is specifically excluded in
accordance with the conditions of Section GC 2.01 of CP3 Gen Con

DATE	BY	DESCRIPTION
Geosys No 30M12-224		
HWY No 427		DIST 6
SUSAN R.A. CHECKED K.A.	DATE 1994 11 17	SITE
DEBORAH D.T. CHECKED C.P.	DATE	DWG 6158900-8

METRIC

DIMENSIONS ARE IN METRES
AND / OR MILLIMETRES UNLESS
OTHERWISE SHOWN. STATIONS
IN KILOMETRES - METRES.

CONT No
WP No 615-89-00



HIGH MAST LIGHTING
HWY 427 FROM CAMPUS RD/
FASKEN DR TO STEELES AVE
BORE HOLE LOCATIONS & SOIL STRATA

SHEET

SEE DRAWING 6158900-A

KEY PLAN
SCALE

LEGEND

- ◆ Bore Hole
- ⊕ Dynamic Cone Penetration Test (Cone)
- ⊗ Bore Hole & Cone
- N Blows/0.3m (Std Pen Test, 475 J/blow)
- CONE Blows/0.3m (60° Cone, 475 J/blow)
- W.L. at time of investigation
1979 07, 1979 08, 1981 12,
1982 05 & 1994 08

No	ELEVATION	CO-ORDINATES	
		NORTH	EAST
14	163.7	4 843 234	294 581
15	164.4	4 843 449	294 548
16	163.3	4 843 738	294 506
17	168.1	4 843 984	294 468
18	171.7	4 844 232	294 431
19	176.1	4 844 556	294 384
20	179.4	4 845 292	294 270
49-71-04	1	168.8	4 843 591 294 493
	5	169.6	4 843 605 294 562
	6	169.7	4 843 579 294 564
49-71-07	1	160.9	4 843 851 294 447
	1	171.9	4 844 821 294 328
153-80-02	5	171.5	4 844 921 294 337
88-78-22	2	172.1	4 845 141 294 265

NOTE

The boundaries between soil strata have been established only at Bore Hole locations. Between Bore Holes the boundaries are assumed from geological evidence.

NOTE: The complete foundation investigation and design report for this project and other related documents may be examined at the Engineering Materials Office, Dominion. Information contained in this report and related documents is specifically included in accordance with the conditions of Section GC 2.01 of OPS Gen Cond.

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NOTE
For Soil details refer to
Record of Borehole Sheets

PLANS
SCALE

0 40m

Appendix B

Additional Borehole Logs from Previous Investigations

References for Borehole Logs

- MTO Foundation Investigation Report for Highway 427 Overpass at Fasken Dr/Campus Rd., W.P. 187-94-01/02 (previously 273-66), GEOCRE 30M12-227, 1995.
- MTO Foundation Investigation Report for Highway 427 NBL over Highway 409, W.P. 657-93-01, GEOCRE 30M12-53, 1972.
- Thurber Engineering Ltd. Foundation Investigation Report for Highway 427 Widening from Fasken Drive to Steeles Avenue, Disco Road / Goreway Drive Overpass, Toronto, Ontario, G.W.P. 202-95-00, GEOCRE 30M12-289, November 26, 2009.
- MTO Foundation Investigation Report for Highway 427 Overpass at Disco Road, W.P. 387-65, 1972.
- MTO Foundation Investigation Report for Highway 427 over Canadian National Railways, W.P. 659-93-01 (previously 213-65), GEOCRE 30M12-235, 1972.
- MTO Foundation Investigation Report for Highway 427 over Woodbine Racetrack Entrance, W.P. 660-93-01 (previously 48-71-02), GEOCRE 30M12-236, 1972.
- MTO Foundation Investigation Report for Highway 427 N-E/W Ramp over Humber River, W.P. 49-71-07, GEOCRE 30M12-143, 1979.
- MTO Foundation Investigation Report for Highway 427 over Humber River, W.P. 49-71-05/06, GEOCRE 30M12-144, 1979.
- Thurber Engineering Ltd. Foundation Investigation Report for Highway 427 Widening from Fasken Drive to Steeles Avenue, CN Halton Subdivision Overhead, Toronto, Ontario, G.W.P. 202-95-00, GEOCRE 30M12-288, November 26, 2009.
- MTO Foundation Investigation Report for Highway 427 over CNR Halton Subdivision, W.P. 153-80-02, GEOCRE 30M12-152, 1982.
- Peto MacCallum Ltd. Foundation Investigation Report for Albion Road Underpass Structure at Highway 427, W.P. 153-80-03, GEOCRE 30M12-164, 1982.
- Golder Associates Foundation Investigation Report for Highway 427 Overpass Bridge at Steeles Avenue, W.P. 153-80-04, GEOCRE 30M12-50, 1982.

30 M 12-227

25

WP 187-94-01/02

DEPARTMENT OF HIGHWAYS - ONTARIO		RECORD OF BOREHOLE No. 1		FOUNDATION SECTION				
MATERIALS & TESTING OFFICE		Co-ORDS: N 4 838 602.1; E 296 518.6		LOCATION Co-ords: 15, 874, 679 N; 972, 830 E.				
JOB 72-11006		BORING DATE Jan. 3 & 4, 1972		ORIGINATED BY TE				
W.P. 273-66		BORING TYPE Penn Drill and Diamond Drill		COMPILED BY 37				
DATUM Geodetic				CHECKED BY [Signature]				
ELEV. DEPTH	SOIL PROFILE	SAMPLING	ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		WATER CONTENT %	BULK DENSITY	REMARKS
				PLASTIC LIMIT	PLASTIC LIMIT			
Sub. 1	Ground Level							
	0.0 Met. mix. of clayey silt sand & gravel, ooc. clayey silt sand	1 SS 21	210					GR. SA. SI. CL. 562.4
	Very Stiff to Hard	2 SS 14						Feb. 8/72
		3 SS 17						6 29 50 17
	Brown Grey	4 SS 16	530					
		5 SS 14						
	Glacial Till	6 SS 17						
		7 SS 14	520					2 18 58 22
		8 SS 11						
		9 SS 11	510					
		10 SS 14						
		11 SS 100%	500					
		12 SS 100%						
		13 SS 189	490					
		14 SS 21	480					
473.1		15 SS 100%	470					
71.0	Shale Bedrock							
	Weathered Sand							
461.1		16 BX 100%						
83.0	End of Borehole							

20
15-3 % STRAIN AT FAILURE
10

WP 187-94-01/02

DEPARTMENT OF HIGHWAYS - ONTARIO			RECORD OF BOREHOLE No. 2			FOUNDATION SECTION			
MATERIALS & TESTING OFFICE			Co-ORDS: N 4838 554.83 E 296 468.0			ORIGINATED BY <u>VK</u>			
JOB <u>72-11006</u>			LOCATION <u>Co-ords. 15,874,655 N; 972,665 E.</u>			CORRECTED BY <u>TT</u>			
W.P. <u>273-66</u>			BORING DATE <u>Jan. 6 & 7, 1972</u>			CHECKED BY <u>CK</u>			
DATUM <u>Geodetic</u>			BOREHOLE TYPE <u>Penn Drill and Diamond Drill</u>						
SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT — % PLASTIC LIMIT — % WATER CONTENT — %		BULK DENSITY γ _{p.c.f.}	REMARKS
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS/100	ELEV. SCALE	SHEAR STRENGTH P.S.F. ○ UNCONFINED * FIELD VANE ● QUICK TRIAXIAL * LAB VANE	WATER CONTENT % 10 20 30		
514.0	Ground Level								
0.0	Ret. mix. of clayey silt, sand & trace of gravel	1	SS	30	590				Feb. 4/72 539.5 h 31 49 18
	occ. clayey silt seam	2	SS	32					
	Ulaolal Till	3	SS	62					
	Very Stiff to Hard	4	SS	40	530				
	Brown	5	SS	29					
	Gray	6	SS	17					
		7	SS	32	520				
		8	SS	10					
		9	SS	50	510				
		10	SS	160	500				5.27 50 18
		11	SS	100					
		12	SS	100	490				
		13	SS	133					
		14	SS	100	480				
		15	SS	100	470				
458.5		16	SS	100	460				5.43 45 7
85.5	Shale bedrock								
454.0	Sound	16	EX	100%					
90.0	End of Borehole								

20
15 — 5 % STRAIN AT FAILURE
10

WP 187-94-01/02

DEPARTMENT OF HIGHWAYS - ALABAMA			RECORD OF BOREHOLE No. 5			FOUNDATION SECTION					
MATERIALS & TESTING OFFICE			Co-ords: N 4838 582.35 E 296 473.5								
JOB 72-11006			LOCATION Co-ords: 15, 476, 614 N; 972, 687 E.			ORIGINATED BY TE					
WP 87-1/6			BORING DATE Jan. 5, 1972			COMPILED BY TJ					
DATUM Original			BOREHOLE TYPE Post Drill & Cone			CHECKED BY <i>SK</i>					
DEPTH	SOIL PROFILE	SAMPLES	ELEV SCALE	DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — % PLASTIC LIMIT — % WATER CONTENT — %	BLK Y DENSITY	REMARKS
				BLOWS/FOOT	30	60	80	100			
0.0	Ground Level										
0.0	Res. mix. of clayey silt, sand & gravel. Very Stiff to Hard	1 35 31	20								4.27 51.18
		2 35 32									539.5
		3 35 32									Feb. 6/72
	Brown Grey	4 35 31	300								
		5 35 32									
		6 35 31									
	Glacial Till	7 35 31	520								
		8 35 31									
		9 35 31									
		10 35 30.2	510								
		11 35 27									
	Occ. silt seams	12 35 26.5	500								
422.5		13 35 26.5									
51.5	End of Borehole		490								

20
15-3 % STRAIN AT FAILURE
10

WP 187-94-01/02

DEPARTMENT OF HIGHWAYS - ONTARIO
 MATERIALS & TESTING OFFICE
 RECORD OF BOREHOLE No. 6
 FOUNDATION SECTION

CO-ORDS: N 4850 614.3; E 296 813.1
 JOB 72-11006 LOCATION Co-ords. 15,874,719.21 972,812.8
 W.P. 273-66 BORING DATE Jan. 4, 1972 ORIGINATED BY TE
 DATUM Goodelle BOREHOLE TYPE Pen Drill & Core COMPILED BY TT
 CHECKED BY

SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE					LIQUID LIMIT — %			BULK DENSITY	REMARKS
EL. DEPTH	DESCRIPTION	STAT NOT	NUMBER	TYPE	ROWS/FOOT	FEET SCALE	20	40	60	80	100	PLASTIC LIMIT — %	WATER CONTENT — %		
549.1	Ground Level														
0.0	Fill														
548.6	Bluff to Very Bluff		1	SS	12										8-35 h3 1b
7.5			2	SS	15										Y 92.1
			3	SS	16										Feb. 4/72
			4	SS	18										
			5	SS	17										
	Brown Grey		6	SS	16										
			7	SS	11										
			8	SS	21										
	Glacial Till		9	SS	19										
	Not mix. of clayey silt, sand & gravel.		10	SS	51										
	Very Stiff to Hard		11	SS	50										
			12	SS	57										
			13	SS	103/6										
492.6			14	SS	122										
56.5	End of Borehole														

20
 15-3 % STRAIN AT FAILURE
 10

15 ²⁰ % STRAIN AT FAILURE

DESIGN SERVICES BRANCH			RECORD OF BOREHOLE NO 20			FOUNDATIONS OFFICE			
JOB <u>72-11017</u>			LOCATION <u>15,877,535N. 971,684 E.</u>			ORIGINATED BY <u>H.S.</u>			
W.P. <u>483-65 657-93-01</u>			BORING DATE <u>February 10 & 14, 1972</u>			COMPILED BY <u>T.S.T.</u>			
DATUM <u>Geodetic</u>			BOREHOLE TYPE <u>Penn Drill</u>			CHECKED BY <u>LO</u>			
SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT W_L		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	20 40 60 80 100	PLASTIC LIMIT W_P		
524.4	Ground elevation.								
	Het. mix. of clayey silt, sand & gravel.	1	SS	43	520				
		2	SS	50					
	Brown	3	SS	56					
	Grey	4	SS	72					
509.4		5	SS	116	510				
15.0	Silt to sandy silt.	6	SS	113					
504.4		7	SS	75					
19.0	Glacial Till.	8	SS	43	500				
	Hard.	9	SS	79					
489.4		10	SS	115	490				
487.9	Silt to sandy silt.	11	SS	100	5"				
36.5		12	SS	100	4"				
484.4		13	SS	100	2"				
40.0	With shale fragments	14	SS	100	2"				
		15	SS	100	2"				
444.3		16	RC Rec. BXL	95%	440				
80.1	Shale Bedrock.								
439.3	Sound - grey.								
85.1	End of borehole.								

SOIL PROFILE		SAMPLES		ELEV SCALE	DYNAMIC TEST DATA (P.S.F.)	LIQUID LIMIT (W _L)	PLASTIC LIMIT (W _P)	WATER CONTENT (W)	SUC	REMARKS			
ELEV DEPTH	DESCRIPTION	NUMBER	TYPE								ROWS/FOOT	20	40
521.3	Ground elevation												
	Ret. mix. of clayey silt, sand & gravel.	1	SS	58									
	Brown	2	SS	58									
	Grey	3	SS	44									
	Glacial Till.	4	SS	95									
	Stiff to hard.	5	SS	80									
		6	SS	78									
		7	SS	72									
496.3		8	SS	80									
25.0	Silt to sandy silt.												
490.3	Very dense. Grey.	9	SS	1007									
31.0													
486.8		10	SS	1257									
34.5	With shale fragments	11	SS	1007									
		12	SS	1007									
		13	SS	1007									
463.3	Probable bedrock.												
58.0	End of borehole.												

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE NO 26

FOUNDATIONS OFFICE

IMPERIALJOB 72-11017LOCATION 15,877,491 N. 971,533 E.ORIGINATED BY H.S.W.P. 657-93-01BORING DATE Feb. 7 & 8, 1972COMPILED BY T.S.T.DATUM GeodeticBOREHOLE TYPE Penn DrillCHECKED BY SL

SOIL PROFILE			SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100 SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X 1AB VANE	LIQUID LIMIT w_L PLASTIC LIMIT w_p WATER CONTENT w w_p — w — w_L WATER CONTENT % 10 20 30	BULK DENSITY γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT					
525.1	Ground elevation.									
	Int. mix. of clayey silt, sand & gravel.		1	SS	50					
			2	SS	65					
	Brown		3	SS	62					
	Grey		4	SS	68					
	Glacial Till		5	SS	44					
			6	SS	72					
	Hard.		7	SS	68					
500.1			8	SS	87					
25.0	Sandy silt to silty sand.		9	SS	170.6"					
493.6			10	SS	110.2"					
31.5			11	SS	150.2"					
490.1	With shale fragments		12	SS	100.1"					
35.0			13	SS	105.1"					
			14	SS	100.1"					
459.6	Probable bedrock.									
65.5	End of borehole.									

DESIGN SERVICES UNIT			RECORD OF BOREHOLE NO 27				FOUNDATIONS OFFICE								
JOB <u>77-11317</u>			LOCATION <u>15,877,677 N. 571,540 E.</u>				ORIGINATED BY <u>H.S.</u>								
WP <u>657-93-01</u>			BORING DATE <u>Feb. 10, 1972</u>				COMPILED BY <u>T.S.T.</u>								
DATUM <u>Geodetic</u>			BOREHOLE TYPE <u>Penn Drill</u>				CHECKED BY <u>22</u>								
FLV DEPTH	SOIL PROFILE DESCRIPTION	SOIL STATUS	SAMPLES		BLOW COUNT	HYDRAULIC PERMEABILITY RESISTANCE					LIQUID LIMIT			BULK DENSITY	REMARKS
			NUMBER	TYPE		20	30	40	50	100	W _p	W _L	W _U		
536.5	Ground elevation.														
	Fill material.		1	SS	22										
	Clayey silt with sand and gravel.		2	SS	17	530									
	Stiff to very stiff.		3	SS	11										
520.8	Grey.		4	SS	23										
15.7	Het. mix. of clayey silt, sand & gravel.		5	SS	20	520									
	Very stiff to hard.		6	SS	30										
	Brown		7	SS	54										
	Grey		8	SS	24	510									
	Glacial Till.		9	SS	32										
500.5			10	SS	397	500									
36.0	Silt to sandy silt.														
496.5	Very dense - Grey.		11	SS	120										
40.0			12	SS	1087	490									
			13	SS	1002										
			14	SS	1007	480									
473.5	Probable bedrock.														
63.0	End of borehole.					470									
						460									

15 \pm 5 % STRAIN AT FAILURE

1 OF 3

METRIC

G.W.P. 202-95-00

LOCATION

N 4 840 128.4 E 295 955.1 Disco Rd./Goreway Dr.

ORIGINATED BY GA

HWY 427

BOREHOLE TYPE Solid Stem Auger

COMPILED BY AN

DATUM Geodetic

DATE 2008.11.12 - 2008.11.17

CHECKED BY SKP

Continued Next Page

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-01

2 OF 3

METRIC

G.W.P. 202-95-00

LOCATION N 4 840 128.4 E 295 955.1 Disco Rd./Goreway Dr.

ORIGINATED BY GA

HWY 427

BOREHOLE TYPE Solid Stem Auger

COMPILED BY AN

DATUM Geodetic

DATE 2008.11.12 - 2008.11.17

CHECKED BY SKP

[illegible]

Continued Next Page

+³, ×³: Numbers refer to Sensitivity

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-01

3 OF 3

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 128.4 E 295 955.1 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.11.12 - 2008.11.17 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa								
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE								
Continued From Previous Page							20 40 60 80 100 40 80 120 160 200	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT W _p W W _L WATER CONTENT (%)						GR SA SI CL		
20.0	Silty CLAY, trace sand Hard Brown		14	SS	33		149								0 7 44 49	
148.1																
21.3	Clayey SILT, with frequent shale and limestone slabs Hard Grey (TILL)		15	SS	100/ 0.225		148									
146.6																
22.9	SHALE, highly to moderately weathered, with limestone interbeds, very thinly to thinly bedded, grey Zones of broken core Limestone (50mm) at 24m Clay seams (50mm) at 25m Limestone (120mm) at 25.5m		16	SS	50/ 0.0		147									
				1	RUN		146									RUN 1# TCR=80%, SCR=0%, RQD=0%
				2	RUN		145									RUN 2# TCR=100%, SCR=27%, RQD=8%
							144									
143.5																
25.9	END OF BOREHOLE AT 25.9m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.															

+³, X³: Numbers refer to
Sensitivity
 20
15 10 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-02

1 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 157.8 E 295 941.7 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.11.18 - 2008.11.18 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	40 80 120 160 200						WATER CONTENT (%)
160.9	Clayey SILT and sand, trace to some gravel, occasional rootlets Very Stiff to Hard Brown (FILL) Mottled Brown to Grey		1	SS	21									11 33 37 19	
			2	SS	57										
			3	SS	40										
			4	SS	24										3 32 37 28
157.4			5	SS	85										
3.5	Sandy SILT, trace clay, trace gravel Very Dense to Compact Reddish Brown Moist (FILL) Occasional shale pieces														
			6	SS	21										
154.8	Clayey SILT and sand, trace gravel Very Stiff to Hard Mottled Brown to Grey (FILL)		7	SS	19									3 36 36 25	
153.7	Clayey SILT and sand, trace gravel Hard Grey (TILL)		8	SS	42										
			9	SS	39										

Continued Next Page

+ 3, X 3: Numbers refer to
 20
 15 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-02

2 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 157.8 E 295 941.7 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.11.18 - 2008.11.18 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
								○ UNCONFINED	+ FIELD VANE	● QUICK TRIAXIAL						x LAB VANE	WATER CONTENT (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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ONTMT4S 9270.GPJ 7/7/09

+³, X³: Numbers refer to
Sensitivity

20
15 5
25
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-03

1 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 184.5 E 295 932.2 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.10.28 - 2008.10.28 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT		NATURAL MOISTURE CONTENT		LIQUID LIMIT		UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	W _p	W	W _L	WATER CONTENT (%)	GR	SA	SI		
161.2																	
0.0	Clayey SILT and sand, trace gravel, rootlets Stiff to Very Stiff Brown (FILL)		1	SS	19		161										7 38 34 21
			2	SS	62/ 0.200		160										
			3	SS	22		159										
			4	SS	16		158										
158.2	Silty CLAY and sand, trace gravel Very Stiff to Stiff (FILL)		5	SS	17		157										4 27 38 31
3.0			6	SS	10		156										
156.7	Occasional shale slabs		7	SS	10		155										
4.5			8	SS	8		154										
			9	SS	25		153										
			10	SS	23		152										0 8 42 50
152.5	Silty CLAY, trace sand, trace gravel Very Stiff Grey																
8.7																	

Continued Next Page

+ 3 . X 3 : Numbers refer to
Sensitivity 20
15 5
10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 7/29/09

RECORD OF BOREHOLE No GD-03

2 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 184.5 E 295 932.2 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.10.28 - 2008.10.28 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							
								20 40 60 80 100							
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE				PLASTIC LIUIT NATURAL MOISTURE CONTENT LIQUID LIMIT W P W W L WATER CONTENT (%)			
								40 80 120 160 200				20 40 60			
	Continued From Previous Page						151								
150.2	Silty CLAY, trace sand, trace gravel Very Stiff Grey		11	SS	25										
11.0	Clayey SILT, with frequent shale and limestone slabs, trace sand Hard Grey (TILL)						150								
			12	SS	80/ 0.235		149								
			13	SS	100		148								
			14	SS	100/ 0.235		147								
145.8							146								
15.4	SHALE, highly weathered, thinly bedded, grey, limestone interbeds		15	SS	100										
145.5															
15.7	END OF BOREHOLE AT 15.7m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.														

+³ . X³ : Numbers refer to Sensitivity 20 15 10 (% STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-04

1 OF 3

METRIC

G.W.P. 202-95-00

LOCATION N 4 840 212.4 E 295 915.5 Disco Rd./Goreway Dr.

ORIGINATED BY GA

HWY 427

BOREHOLE TYPE Solid Stem Auger

COMPILED BY AN

DATUM Geodetic

DATE 2008.11.06 - 2008.11.07

CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w		
171.0												
0.0	Silty CLAY, trace sand, trace gravel, occasional rootlets Very Stiff Brown (FILL)		1	SS	17		171					
169.5							170					
1.5	Clayey SILT and sand, trace gravel Very Stiff Mottled Brown to Grey (FILL)		2	SS	21		169					
							168					
			3	SS	18		167					
							166					
			4	SS	16		165					
							164					
	Grey		5	SS	18		163					
							162					
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RECORD OF BOREHOLE No GD-04

2 OF 3

METRIC

G.W.P. 202-95-00

LOCATION N 4 840 212.4 E 295 915.5 Disco Rd./Goreway Dr.

ORIGINATED BY GA

HWY 427



BOREHOLE TYPE Solid Stem Auger

COMPILED BY AN

DATUM Geodetic

DATE 2008.11.06 - 2008.11.07

CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa			WATER CONTENT (%)					
								20 40 60 80 100	○ UNCONFINED + FIELD VANE	● QUICK TRIAXIAL × LAB VANE	w _p w w _L					
								40 80 120 160 200								
	Continued From Previous Page						161									
	Clayey SILT and sand, trace gravel Hard Mottled Brown to Grey (FILL)		8	SS	49		160									
					9	SS	46		159							
							158									
			10	SS	49		157									
155.8							156									
15.2	Clayey SILT and sand, trace gravel Hard Mottled Brown to Grey (TILL)		11	SS	36		155									
	Brown		12	SS	84		154									
							153									
			13	SS	68		152									

Continued Next Page

+ 3, X 3: Numbers refer to Sensitivity
20
15 5
(%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 6/26/09

RECORD OF BOREHOLE No GD-04

3 OF 3

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 212.4 E 295 915.5 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.11.06 - 2008.11.07 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT	WATER CONTENT (%)	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES							
	Continued From Previous Page											
	Clayey SILT and sand, trace gravel Hard Grey (TILL)		14	SS	32		151					
			15	SS	74		150					
							149					
148.1												
23.0	Frequent shale and limestone slabs		16	SS	92/ 0.250		148					
							147					
			17	SS	114/ 0.225		146					
							145					
			18	SS	100/ 0.075		144					
143.5												
27.5	END OF BOREHOLE AT 27.5m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		19	SS	100/ 0.075							
	WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.05 14.4 156.6 2009.06.08 14.3 156.7											

ONTMT4S 9270.GPJ 7/3/09

+ 3, x 3: Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-05

1 OF 3

METRIC

G.W.P. 202-95-00

LOCATION N 4 840 127.4 E 295 961.7 Disco Rd./Goreway Dr.

ORIGINATED BY GA

HWY 427

BOREHOLE TYPE Solid Stem Auger

COMPILED BY AN

DATUM Geodetic

DATE 2008.11.11 - 2008.11.12

CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	40 80 120 160 200	W _p	W	W _L		
170.0														
0.0	Sandy SILT, some clay, occasional rootlets and organics Dense Black to Brown Grey Moist (FILL)		1	SS	33									
168.5														
1.5	Clayey SILT and sand, trace gravel Stiff Brown (FILL)		2	SS	13									
	Hard		3	SS	34									
			4	SS	30									
	Mottled brown to grey		5	SS	32									
			6	SS	34									
			7	SS	38									

ONTMT4S 9270.GPJ 6/26/09

Continued Next Page

+ 3, X 3: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-05

2 OF 3

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 127.4 E 295 961.7 Disco Rd /Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.11.11 - 2008.11.12 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	40 60 80 100 120 140 160 180 200					
	Continued From Previous Page													
	Clayey SILT and sand, trace gravel Very Stiff to Hard Brown to Grey (FILL)		8	SS	37		160							
	Wood pieces		9	SS	29		159							
	Occasional organics		10	SS	39		158							
155.2							157							
14.8	Clayey SILT and sand, trace gravel Very Stiff to Hard Mottled Brown (TILL)		11	SS	27		156							0 28 45 27
			12	SS	39		155							
			13	SS	48		154							
	Grey						153							
							152							
							151							

Continued Next Page

+ 3 . X 3 : Numbers refer to Sensitivity 20 15 10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-05

3 OF 3

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 127.4 E 295 961.7 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.11.11 - 2008.11.12 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	40 80 120 160 200	W P W W L	20 40 60			
	Continued From Previous Page													
148.7	Clayey SILT and sand, trace gravel Very Stiff to Hard Grey (TILL)		14	SS	25		150							
21.3	Frequent shale and limestone slabs, some sand		15	SS	100		149							
			16	SS	149/ 0.225		148							
			17	SS	149		147							1 12 67 20
144.0			18	SS	100/ 0.075		146							
26.0	END OF BOREHOLE AT 26.0m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.05 13.7 156.3 2009.06.08 13.6 156.4						145							

ONTMT4S 9270.GPJ 7/7/09

RECORD OF BOREHOLE No GD-06

1 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 157.1 E 295 946.8 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.10.30 - 2008.10.30 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
								○ UNCONFINED + FIELD VANE						
								● QUICK TRIAXIAL × LAB VANE						
							20 40 60 80 100	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT				WATER CONTENT (%)		
							40 80 120 160 200	w _p w w _L				GR SA SI CL		
160.9														
0.0	Clayey SILT and sand, occasional rootlets Stiff to Very Stiff Brown (FILL)		1	SS	13									
			2	SS	10									
			3	SS	9									
	Mottled brown to grey		4	SS	15									
			5	SS	13									
157.1														
3.7	Silty CLAY and sand, trace gravel Very Stiff (FILL)		6	SS	21									
			7	SS	16									
155.5														
5.4														
	Layer of sandy silt at 6.4m (200mm)		8	SS	13									
153.2														
7.6	Silty CLAY and sand, trace gravel Very Stiff to Hard Grey (TILL)		9	SS	32									
			10	SS	21									
150.9														

Continued Next Page

Continued Next Page

+ 3, × 3: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-06

2 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 157.1 E 295 946.8 Disco Rd./Goreway Dr. ORIGINATED BY GA
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2008.10.30 - 2008.10.30 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
	Continued From Previous Page							20 40 60 80 100						
	Clayey SILT and sand, trace gravel Very Stiff to Hard Grey (TILL)							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE						
150.2								40 80 120 160 200						
10.7	Frequent shale and limestone slabs, sandy		11	SS	31		150							
							149							
			12	SS	86		148							
							147							
			13	SS	118/ 0.225		146							
145.4			14	SS	64/ 0.225									
15.5	END OF BOREHOLE AT 15.5m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.													

RECORD OF BOREHOLE No GD-07

1 OF 2

METRIC

G.W.P. 202-95-00

LOCATION

N 4 840 184.9 E 295 934.3 Disco Rd./Goreway Dr.

ORIGINATED BY GA

HWY 427

BOREHOLE TYPE

Solid Stem Auger

COMPILED BY AN

DATUM Geodetic

DATE

2008.10.29 - 2008.10.30

CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	40 80 120 160 200					
161.2	Clayey SILT and sand, trace gravel, occasional rootlets Very Stiff to Stiff Brown (FILL)		1	SS	18									4 35 36 25
			2	SS	14									
			3	SS	26									
			4	SS	20									
			5	SS	21									
			6	SS	12									
			7	SS	10									
154.0	Silty CLAY and sand, trace gravel Hard Brown (FILL)													4 20 38 38
7.2			9	SS	32									
152.0	Silty CLAY and sand, trace gravel Very Stiff Grey (TILL)													
9.1			10	SS	20									

Continued Next Page

+³, X³: Numbers refer to
Sensitivity 20
15 10 5
(%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 7/29/09

RECORD OF BOREHOLE No GD-07

2 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 184.9 E 295 934.3 Disco Rd./Goreway Dr. ORIGINATED BY GA
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2008.10.29 - 2008.10.30 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
								WATER CONTENT (%)						
	Continued From Previous Page													
	Silty CLAY and sand, trace gravel Hard Grey (TILL)						151							3 29 31 37
	Layer of grey sand (200mm)		11	SS	33		150							
149.6														
11.6	Clayey SILT and sand, trace gravel, Frequent shale and limestone slabs Hard Grey (TILL)						149							
			12	SS	87		148							
	Coring started at 13.7m Limestone (90mm) at 14.0m Shale (80mm) at 14.6m		1	RUN			147							
			2	RUN			146							
	Limestone pieces		3	RUN			145							
	Limestone pieces (50mm) at 16.3m		4	RUN			144							
			5	RUN										
143.2														
18.0	END OF BOREHOLE AT 17.9m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.													

ONTMT4S 9270.GPJ 8/13/09

+ 3, x 3: Numbers refer to
Sensitivity 20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-07A

1 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 184.9 E 295 934.3 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.11.19 - 2008.11.19 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	W _P W W _L	WATER CONTENT (%)				
161.2 0.0	Augered to 10.7m.													
161														
160														
159														
158														
157														
156														
155														
154														
153														
152														

ONTMT4S 9270.GPJ 6/26/09

Continued Next Page

+ 3 . X 3 : Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-07A										2 OF 2		METRIC		
G.W.P. 202-95-00		LOCATION N 4 840 184.9 E 295 934.3 Disco Rd./Goreway Dr.				ORIGINATED BY GA								
HWY 427		BOREHOLE TYPE Solid Stem Auger				COMPILED BY AN								
DATUM Geodetic		DATE 2008.11.19 - 2008.11.19				CHECKED BY SKP								
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
								20 40 60 80 100						
								40 80 120 160 200						
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE		WATER CONTENT (%)				
Continued From Previous Page														
150.5	Clayey SILT, with frequent shale slabs and limestone fragments Hard Grey (TILL)		1	SS	120/ 0.200		151							
10.7							150							
			2	SS	100		149							
							148							
			3	SS	100		147							
145.9			4	SS	100/ 0.075		146							
15.3	END OF BOREHOLE AT 15.3m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.													

ONTMT4S 9270.GPJ 7/29/09

RECORD OF BOREHOLE No GD-08

1 OF 3

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 211.8 E 295 922.3 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.11.07 - 2008.11.10 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					
								20 40 60 80 100					
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE					
171.0													
0.0	Clayey SILT and sand, trace gravel, occasional rootlets Stiff to Hard Mottled Brown to Grey (FILL)		1	SS	10								6 32 38 23
			2	SS	18								
			3	SS	13								
			4	SS	34								
			5	SS	26								0 34 41 25
			6	SS	40								
162.2	Clayey SILT and sand, trace gravel Hard Grey (TILL)		7	SS	58								

Continued Next Page

+ 3, X 3: Numbers refer to

20
15 5

RESTRAIN AT FAILURE

ONTMT-4S 9270.GPJ 7/7/09

RECORD OF BOREHOLE No GD-08

2 OF 3

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 211.8 E 295 922.3 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.11.07 - 2008.11.10 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	120 140 160 180 200	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	
	Continued From Previous Page												
	Clayey SILT and sand, trace gravel Hard Mottled Brown to Grey (TILL)		8	SS	71		161						
							160						
			9	SS	65		159						
							158						
			10	SS	50		157						
							156						
			11	SS	80		155						
							154						
			12	SS	100		153						
							152						
153.0													
18.0	Silty CLAY, some sand Hard Grey		13	SS	83								
151.0													

ONTMT4S 9270.GPJ 7/7/09

Continued Next Page

+ 3 . X 3: Numbers refer to 20
15 5 10/100 GRAIN AT CAR 100

RECORD OF BOREHOLE No GD-08

3 OF 3

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 211.8 E 295 922.3 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.11.07 - 2008.11.10 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	W _P W W _L						
SHEAR STRENGTH kPa								WATER CONTENT (%)							
							○ UNCONFINED + FIELD VANE								
							● QUICK TRIAXIAL × LAB VANE								
							40 80 120 160 200	20 40 60							
20.0	Continued From Previous Page		14	SS	31		151								
	Clayey SILT, with frequent shale and limestone slabs Hard Mottled Brown to Grey (TILL)							150							
			15	SS	128/ 0.275										
								149							
			16	SS	100/ 0.175			148							
								147							
			17	SS	100/ 0.075			146							
145.0				18	SS	100/ .0.0		145							
26.1	END OF BOREHOLE AT 26.1m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.														

ONTMT4S 9270.GPJ 7/3/09

+ 3, X 3: Numbers refer to Sensitivity
 20
 15 5
 10 (%) STRAIN AT FAILURE

METRIC

ORIGINATED BY GA

COMPILED BY AN

CHECKED BY SKP

Continued Next Page

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-09

2 OF 2

METRIC

G.W.P. 202-95-00

LOCATION

N 4 840 121.9 E 295 960.2 Disco Rd./Goreway Dr.

ORIGINATED BY GA

HWY 427

BOREHOLE TYPE Solid Stem Auger

COMPILED BY AN

DATUM Geodetic

DATE

2008.11.08 - 2008.11.08

CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE						
	Continued From Previous Page						20 40 60 80 100							
	Clayey SILT and sand, trace gravel Very Stiff Mottled Brown to Grey (FILL)		11	SS	20									
	Wood fragments													
157.4			12	SS	35									
12.6	Clayey SILT and sand, trace gravel, occasional organics Very stiff Grey to Brown (TILL)													
			13	SS	22									
154.2			14	SS	22									3 29 41 27
15.8	END OF BOREHOLE AT 15.8m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.													

+ 3, x 3: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No GD-10

1 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 840 225.3 E 295 912.6 Disco Rd./Goreway Dr. ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.11.06 - 2008.11.06 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N* VALUES			20 40 60 80 100	120 140 160 180 200	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
170.2														
0.0	Silty CLAY, trace to some sand, trace gravel, occasional rootlets Firm to Very Stiff Brown to Grey (FILL)		1	SS	7		170							
			2	SS	16		169							
168.1			3	SS	22									
2.1	Silty SAND, some clay, trace gravel Compact Brown Moist to Wet (FILL)		4	SS	15		168							
167.3			5	SS	31		167							
2.9	Clayey SILT and sand, trace gravel Very Stiff to Hard Mottled Brown to Grey (FILL)		6	SS	33		166							
			7	SS	25		165							
			8	SS	23		164							
			9	SS	54		163							
162.6			10	SS	64		162							
7.6	Clayey SILT and sand, trace gravel Hard Grey (TILL)						161							

ONTMT4S 9270.GPJ 6/26/09

Continued Next Page

+ 3, x 3: Numbers refer to Sensitivity
 20 15 10 5 (% STRAIN AT FAILURE)

RECORD OF BOREHOLE No GD-10

2 OF 2

METRIC

G.W.P. 202-95-00

LOCATION

N 4 840 225.3 E 295 912.6 Disco Rd./Goreway Dr.

ORIGINATED BY GA

HWY 427

BOREHOLE TYPE

Solid Stem Auger

COMPILED BY AN

DATUM Geodetic

DATE

2008.11.06 - 2008.11.06

CHECKED BY SKP

[illegible]

ONTMT4S 9270.GPJ 7/29/09

+³, X³: Numbers refer to Sensitivity

OFFICE REPORT ON SOIL EXPLORATION

FORM OD-MT-126 (REV. 1969)

WP 658-93-01

DEPARTMENT OF HIGHWAYS-ONTARIO		RECORD OF BOREHOLE No. 1 IMPERIAL FOUNDATION SECTION	
MATERIALS & TESTING OFFICE		Co-ords: N 4 839 920.1, E 295 980.0	
JOB 72-11002	LOCATION	Co-ords: 15, 879, 003 N; 971, 063 E.	
W.P. 387-05	BORING DATE	Feb. 3, 1972	
DATUM Geodetic	BOREHOLE TYPE	AUGER	
		ORIGINATED BY	YK
		COMPILED BY	TST
		CHECKED BY	

SOIL PROFILE			SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT	SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL	LIQUID LIMIT PLASTIC LIMIT WATER CONTENT	WATER CONTENT %	BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PROF.	NUMBER	TYPE							
509.6	Ground Level										
0.0	H. t. mix. of clayey silty sand & occ. gravel.		1	SS	13						
	Very Stiff - Hard		2	SS	88						
	Glacial Till		3	SS	120						
	Silty sand with gravel		4	SS	30						
			5	SS	120						
			6	SS	107/6"						
	Glacial Till		7	SS	107/6"						
			8	SS	125						
			9	SS	58						
473.6			10	SS	100/3"						
36.0	End of Borehole. Probable Redrock										

WP 658-93-01

DEPARTMENT OF HIGHWAYS - ONTARIO
 MATERIALS & TESTING OFFICE
 JOB 72-11002 LOCATION Co-ords: N 4 839 918.0, E 225 915.4
 W.P. 387-65 BORING DATE Jan. 27, 1972 Co-ords: 15, 878, 926 N; 970, 052 E.
 DATUM Geodetic BOREHOLE TYPE Auger FOUNDATION SECTION Imperial No. 3
 ORIGINATED BY VK
 COMPILED BY TST
 CHECKED BY

ELEV. DEPTH 156.4	SOIL PROFILE DESCRIPTION	STRAT. NO.	SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL x LAB. VANE	LIQUID LIMIT PLASTIC LIMIT WATER CONTENT %	BULK DENSITY γ	REMARKS
			NUMBER	TYPE		20	100				
513.0	Ground Level										
508.0	0.0 Sand and gravel with clayey silt. Compact	1	SS	10	510						
5.0	Hot mix. of clayey silt, sand & gravel	2	SS	39							
	Glacial Till	3	SS	25	500						
	Very Stiff to Hard	4	SS	30							
		5	SS	20							
		6	SS	21							
		7	SS	27	190						
		8	SS	17							
		9	SS	50	180						
171.9		10	SS	60							
38.1	End of Borehole Probably Bedrock	11	SS	11	170						

36 29 27 8
 505.

OFFICE REPORT ON SOIL EXPLORATION

WP 658-93-01

DEPARTMENT OF HIGHWAYS - ONTARIO
 MATERIALS & TESTING OFFICE
 JOB 72-11002 LOCATION Co-ords: N 4839 934.7, E 295 970.6
 W.P. 387-65 BORING DATE Feb. 3, 1972
 DATUM Geodetic BOREHOLE TYPE Avert

RECORD OF BOREHOLE No. 6 IMPERIAL FOUNDATION SECTION
 ORIGINATED BY VK
 COMPILED BY TST
 CHECKED BY C.

ELEV. DEPTH 155.5 510.3	SOIL PROFILE DESCRIPTION	SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		LIQUID LIMIT PLASTIC LIMIT WATER CONTENT %	BULK DENSITY γ	REMARKS
		NUMBER	TYPE		20	100			
0.0	Ground Level			510					
	Het. mix. of clayey silt, sand & gravel	1	SS	500					
	Glacial Till	2	SS	500					
	Very Stiff - Hard	3	SS	500					
		4	SS	500					
		5	SS	500					
		6	SS	500					
		7	SS	500					
		8	SS	500					
	Sand and Gravel	9	SS	500					
		10	SS	500					
	with shale frags.	11	SS	500					
169.8	End of Borehole			510					
169.5	weathered shale probably bedrock			510					

WP 658-93-01

DEPARTMENT OF HIGHWAYS - ONTARIO
 MATERIALS & TESTING OFFICE
 JOB 72-11002 LOCATION Co-ords: N4 839 935.7, E 295 905.0
 W.P. 387-05 BORING DATE Jan. 28, 1972 Co-ords. 15,879,054 N; 970,817 E.
 DATUM Geodetic BOREHOLE TYPE Auger, EXL. Core
 RECORD OF BOREHOLE No. 8 IMPERIAL FOUNDATION SECTION
 ORIGINATED BY VI COMPILED BY TST
 CHECKED BY S.A.

ELEV. DEPTH	SOIL PROFILE DESCRIPTION	SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT		SHEAR STRENGTH P.S.F.		WATER CONTENT %	BULK DENSITY γ	REMARKS
		NUMBER	TYPE		20	40	60	80			
512.8	Ground Level										
0.0	Net mix. of clayey silt and sand, trace of gravel	1	SS	510							
		2	SS	500							
	Glacial Till	3	SS	490							
	Stiff to Hard	4	SS	480							
		5	SS	470							
		6	SS	460							
		7	SS	450							
		8	SS	440							
		9	SS	430							
		10	SS	420							
472.8	with shale frags.			410							
460.0	weathered			400							
445.8	Shale bedrock ground			390							

506.5
335 lb 14

0 5 47 48

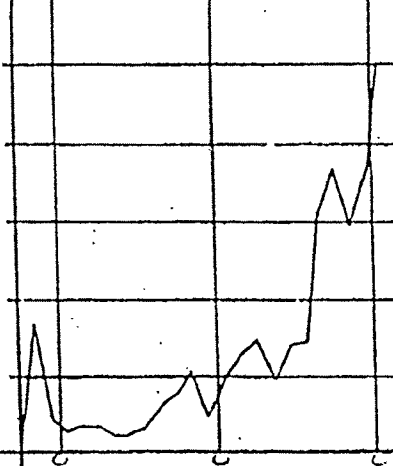
WP 658-93-01

DEPARTMENT OF HIGHWAYS - ONTARIO
 MATERIALS & TESTING OFFICE
 JOB 72-11002
 W.P. 387-65
 DATUM Geodetic

RECORD OF BOREHOLE No. 11 IMPERIAL FOUNDATION SECTION
 Co-ords: N 4839 963.4, E 295 958.7
 Co-ords. 15, 079, 145 N; 970, 993 E.
 LOCATION
 BORING DATE Feb. 14, 1972
 BOREHOLE TYPE Washboring, NX Casing

ORIGINATED BY VK
 COMPILED BY TST
 CHECKED BY S.A.

ELEV. DEPTH	SOIL PROFILE DESCRIPTION	STRAT. PLT	SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT		LIQUID LIMIT PLASTIC LIMIT WATER CONTENT %	BACK DENSITY γ	REMARKS
			NUMBER	TYPE		20	100			
522.5	Ground Level									
517.5	Gravel, some sand, trace of clay & silt. Compact Fill		1	SS						
510.5			2	SS						
			3	SS						
			4	SS						
506.5	Garbage Fill		5	SS						
16.0	Glacial Till		6	SS						
			7	SS						
			8	SS						
			9	SS						
1486.0	Stiff to Hard		10	SS						
36.5	End of Borehole									



505.

11 28 43 18

WP 658-93-01

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 13 IMPERIAL FOUNDATION SECTION

Co-ords: N 4 839 960.3, E 275 894.4

ORIGINATED BY VK

Co-ords: 15, 872, 135 N; 970, 792 E.

JOB 72-21002

COMPILED BY TST

W.P. 387-65 BORING DATE Feb. 31, 1972

CHECKED BY

DATUM Geodetic BOREHOLE TYPE Auger

SOIL PROFILE		SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT		REMARKS
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE		BLOWS/FOOT	RESISTANCE	PLASTIC LIMIT	WATER CONTENT	
513.0	Ground Level								
0.0	Hot mix. of clayey silt, sand & gravel	1	SS	4					0 44 42 16
		2	SS	2					505.0
		3	SS	12					
	Glacial Till	4	SS	12					
	Firm to Hard	5	SS	10					
		6	SS	20					
		7	SS	10					
	Sand & Gravel	8	SS	10					22 39 28 11
	shale frags.	9	SS	10					
		10	SS	10					
472.0	End of Borehole								
470.2	Probably bedrock								

WP 658-93-01

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 16 IMPERIAL FOUNDATION SECTION

72-21002 LOCATION CO-ORDS: N 4 839 977.1, E 295 948.6
 W.P. 387-65 BOBING DATE Feb. 2 & 27 Jan. 1972 ORIGINATED BY HS & YK
 DATUM Geodetic BOREHOLE TYPE Auger, NI Casinr, Washborier COMPILED BY TST
 CHECKED BY S.S.

ELEV. DEPTH (ft.)	SOIL PROFILE DESCRIPTION	STRAT. NO.	SAMPLES			ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS/FOOT				LIQUID LIMIT PLASTIC LIMIT WATER CONTENT	BULK DENSITY P.C.F.	REMARKS
			NUMBER	TYPE	BLOWS/FOOT		20	40	60	100			
528.9	Ground level												
0.0	Fill material, clayey silt with sand and gravel.		1	SS	10								7 29 43 17
50.6			2	SS	10								
7.5			3	SS	27	520							
			4	SS	16								
	Garbage Fill		5	SS	1								
507.1			6	SS	5	510							
72.9	Glacial Till		7	SS	23								
	Hot mix. of clayey silt sand & gravel		8	SS	23								505.5 7 23 43 27
	Stiff to Hard		9	SS	13	500							
			10	SS	117								
	Sand and gravel		11	SS	111	490							16 40 26 18
			12	SS	101	480							
	with shale frags.		13	SS	3	470							
			14	SS	1								
663.9	weathered		15	SS	1								
65.0	Shale Bedrock		17	SH	1	660							
659.9	End of Borehole												
70.0													

20
10-3 % STRAIN AT FAILURE
15

WP 658-93-01

DEPARTMENT OF HIGHWAYS- ONTARIO
 MATERIALS & TESTING OFFICE
 JOB 72-11002 LOCATION Co-ords: N 4 829 974.7, E 295 918.1
 W.P. 387-65 BORING DATE Feb. 3, 1972
 DATUM Geodetic BOREHOLE TYPE Auger

RECORD OF BOREHOLE No. 17 IMPERIAL FOUNDATION SECTION
 ORIGINATED BY VK
 COMPILED BY TST
 CHECKED BY A.C.

ELEV. DEPTH (56.2)	SOIL PROFILE DESCRIPTION	SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION BLOWS/FOOT	SHEAR STRENGTH P.S.F. ○ UNCONFINED ● QUICK TRIAXIAL	FIELD VANE LAB. VANE	LIQUID LIMIT PLASTIC LIMIT WATER CONTENT %	BULK DENSITY γ	REMARKS
		NUMBER	TYPE							
512.6	Ground Level									
508.1	Fill Material	1	SS	21						
4.5	Glacial Till Het. mix. of clayey silt, sand & gravel	2	SS	77						
		3	SS	75						
		4	SS	110						
		5	SS	111						
		6	SS	27						
		7	SS	31						
		8	SS	65						
476.6	with shale frags.	9	SS	100						
36.0	weathered shale End of Borehole Probable Bedrock	10	SS	100						

WP 658-93-01

DEPARTMENT OF HIGHWAYS - ONTARIO

MATERIALS & TESTING OFFICE

RECORD OF BOREHOLE No. 18 IMPERIAL FOUNDATION SECTION

Co-ords: N 4839 998.7, E 295 883.1

Co-ords: 15,879.205 N; 970,715 E.

ORIGINATED BY VK

BORING DATE Feb. 1, 1972

COMPILED BY TST

BOREHOLE TYPE Auger, BXL Core

CHECKED BY J.R.

DATUM Geodetic

ELEV. DEPTH 155.2 508.3	SOIL PROFILE DESCRIPTION	STRAT. POT	SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT PLASTIC LIMIT WATER CONTENT	BULK DENSITY γ	REMARKS
			NUMBER	TYPE		BLOWS/FOOT	SHEAR STRENGTH P.S.F. O UNCONFINED O QUICK TRIAXIAL X LAB. VANE			
0.0	Ground Level									
	Hot. mix. of clayey		1	SS	5					
	silt, sand & gravel		2	SS	69					
	Glacial Till		3	SS	85					
	Firm to Hard		4	SS	80					
			5	SS	59					
			6	SS	63					
			7	SS	80					
			8	SS	80					
			9	SS	80					
			10	SS	80					
			11	RC	80					
467.8										
461.5	Shale Bedrock									
462.8	Sound									
464.5	End of Borehole									

DESIGN SERVICES BRANCH				RECORD OF BOREHOLE NO. 1				FOUNDATIONS OFFICE			
WP 659-93-01				Co-ords: N 4840353.2, E 295735.9				IMPERIAL			
JOB 72-11022				LOCATION Co-ord's 880,424 N. 970,262 E.				ORIGINATED BY V.K.			
WP. 21-65				BORING DATE March 13, 1972				COMPILED BY V.K.			
DATUM Geodetic				BOREHOLE TYPE Auger and Sample with C.M.Z.				CHECKED BY <i>So</i>			
SOIL PROFILE		SAMPLES		ELEV. SCALE		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT	BLows / FOOT	20 40 60 80 100	PLASTIC LIMIT	WATER CONTENT		
545.7	Ground level.										
0.0	Het. mixture of clayey silt, sand & gravel. Glacial Till.		1	SS	20						
			2	SS	74						
			3	SS	33						
532.7	Brown		4	SS	27						
13.0	Grey		5	SS	20						
	Very stiff to hard.		6	SS	20						
			7	SS	19						
			8	SS	20						
			9	SS	24						
			10	SS	23						
			11	SS	55						
			12	SS	116						
			13	SS	53						
474.7			14	SS	100						
71.0	End of borehole.										

20
15 $\frac{1}{2}$ 5 % STRAIN AT FAILURE
10

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

DESIGN SERVICES BRANCH

RECORD OF BOREHOLE No 2

FOUNDATIONS OFFICE
IMPERIAL

WP 659-93-01

Co-ORDS: N 4 840 364.5, E 295 760.2

JOB 72-11022

LOCATION Co-ord's 880,461 N. 970,342 E.

ORIGINATED BY Y.K.

W.P. 213-65

BORING DATE March 6, 1972

COMPILED BY Y.K.

DATUM Geodetic

BOREHOLE TYPE Auger and Sample with C.H.E. Machine.

CHECKED BY

SOIL PROFILE		SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT — W _L PLASTIC LIMIT — W _P WATER CONTENT — W _P	WATER CONTENT % 10 20 30	BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER TYPE BLOWS/FOOT						
546.9	Ground level.								
0.0	1. mixture of clayey silt, sand & gravel. Glacial Till.		1 SS 17	540					
			2 SS 36						
532.9	Brown		3 SS 57						
14.0	Grey.		4 SS 37	530					
	Stiff to hard.		5 SS 13						
			6 SS 19	520					
			7 SS 22						
			8 SS 15	510					
			9 SS 26						
			10 SS 44	500					
			11 SS 100/5"	490					
			12 SS 120/5"	480					
469.9	Fragments of shale		13 BXL Rec 40%	470					
77.0	Shale Bedrock.		14 BXL Rec. 70%						
465.9	Grey. Sound								
81.0	End of borehole.			460					

20
15 5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

DESIGN SERVICES BRANCH				RECORD OF BOREHOLE No 3				FOUNDATIONS OFFICE			
WP 659-93-01				Co-ordinates 840 375.2, E 295 755.4				IMPERIAL			
JOB 72-11022				LOCATION Co-ord's 880,496 N. 970,326 E.				ORIGINATED BY V.K.			
W.P. 213-65				BORING DATE March 13, 1972				COMPILED BY V.K.			
DATUM Geodetic				BOREHOLE TYPE Auger and Sample with C.M.E. Machine				CHECKED BY			
SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE				LIQUID LIMIT — W _L		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	BLOWS / FOOT 20 40 60 80 100	PLASTIC LIMIT — W _P	WATER CONTENT — W _t		
547.9	Ground level.										
0.0	Het. mixture of clayey silt, sand & gravel.		1	SS	29						
	Glacial Till.		2	SS	27						
			3	SS	76						
535.4	Brown.		4	SS	26						
12.5	Grey.		5	SS	19						
	Very stiff to hard.		6	SS	18						
			7	SS	23						
			8	SS	19						
			9	SS	23						
512.9	156.3		10	SS	31						
35.0	Silty sand, traces of clay & gravel.		11	SS	40						
	Dense.										
423.9			12	SS	97						
44.0	Het. mix. of clayey silt, sand & gravel.										
	Glacial Till.										
	Hard.		13	SS	55						
477.4			14	SS	1007						
70.5	End of borehole.										

20
15 5 % STRAIN AT FAILURE
10

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

DESIGN SERVICES BRANCH				RECORD OF BOREHOLE NO. 4				FOUNDATIONS OFFICE			
WP 659-93-01				Co-ords: N 4840 395.6, E 295 745.3				IMPERIAL			
JOB 72-11022				LOCATION Co-ord's 880,563 N. 970,297 E.				CHECKED BY V.K.			
W.P. 213-65				BORING DATE March 7, 1972				CORRECTED BY V.K.			
DATUM Geodetic				BOREHOLE TYPE Auger and Sample with C.M.E. Machine.				CHECKED BY <u> </u>			
SOIL PROFILE		SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT — W _L PLASTIC LIMIT — W _P WATER CONTENT — W _c W _p — W _c — W _L WATER CONTENT % 10 20 30	BULK DENSITY Y P.C.F. GR. SA. SI. CL.	REMARKS			
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER TYPE BLOWS/FOOT								
548.4	Ground level.										
0.0	Het. mix. of clayey silt, sand & gravel. Glacial Till.		1 SS 26								
			2 SS 35								
536.9	Brown Grey		3 SS 63								
11.3	Very stiff to hard.		4 SS 59								
			5 SS 23								
			6 SS 27								
			7 SS 39								
			8 SS 31								
			9 SS 37								
512.4	156.2		10 SS 90								
36.0	Silty sand, traces of clay and gravel. Dense.		11 SS 44								
502.4											
46.0	Het. mix. of clayey silt, sand & gravel. Glacial Till. Hard.		12 SS 50								
			13 SS 72								
	Fragments of shale		14 SS 100 73								
471.9			15 BXL Rec. 5%								
76.5	Shale bedrock.										
467.4	Grey. Sound		16 BXL Rec. 90%								
81.0	End of borehole.										

20
15 5 % STRAIN AT FAILURE
10

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

DESIGN SERVICES BRANCH				RECORD OF BOREHOLE NO 5				FOUNDATIONS OFFICE					
WP 659-93-01				Co-ords: N 4840415.7, E 255735.6				IMPERIAL					
JOB 72-11022				LOCATION Co-ord's 880,629 N. 970,261 N.				ORIGINATED BY V.K.					
W.P. 213-65				BORING DATE March 6, 1972				COMPILED BY V.K.					
DATUM Geodetic				BOREHOLE TYPE Auger and Sample with C.M.E. Machine				CHECKED BY					
SOIL PROFILE		SAMPLES		ELEV. SCALE		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT		BULK DENSITY		REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	BLOWS / FOOT 20 40 60 80 100	PLASTIC LIMIT	WATER CONTENT	W _p	W _L	P.C.F.	GR. SA. SI. CL.
546.5	Ground level.												
0.0	Het. mix. of clayey silt, sand & gravel. Glacial Till.		1	SS	37	540							
			2	SS	26								
535.5	Brown		3	SS	55								
11.0	Grey.		4	SS	23								
	Stiff to hard.		5	SS	13	530							
			6	SS	17								
			7	SS	29								
			8	SS	36	520							
			9	SS	28								
508.5	155		10	SS	74	510							
38.0	Silty sand, traces of clay & few gravel. Dense.		11	SS	30								
500.5						500							
46.0	Het. mix. of clayey silt, sand & gravel. Glacial Till. Hard.		12	SS	36	490							
			13	SS	71	480							
476.4	Fragments of shale		14	SS	100	470							
70.1	End of borehole.												

OFFICE REPORT ON SOIL EXPLORATION

20
15 5 % STRAIN AT FAILURE
10

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

DESIGN SERVICES BRANCH				RECORD OF BOREHOLE N ^o 6				FOUNDATIONS OFFICE									
WP 659-93-01				Co-ords: N 48 40 31.2, E 295 697.8				IMPERIAL									
JOB 72-11022				LOCATION Co-ords 880,455 N. 970,137 E.				ORIGINATED BY V.K.									
W.P. 213-65				BORING DATE March 10, 1972				COMPILED BY V.K.									
DATUM Geodetic				BOREHOLE TYPE Auger and Sample with C.M.E. Machine.				CHECKED BY									
SOIL PROFILE		SAMPLES		ELEV. SCALE		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT		PLASTIC LIMIT		WATER CONTENT		BULK DENSITY		REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT	20'	40	60	80	100	W _p	W _L	W _p	W _L	W _p	W _L	REMARKS
546.6	Ground level.																
U.0	Het. mix. of clayey silt, sand & gravel. Glacial Till.		1	SS	20												541.1 W.L. 1 27.56 16
533.1	Brown		2	SS	32												
13.5	Grey		3	SS	50												
	Very stiff to hard.		4	SS	52												
			5	SS	18												
			6	SS	30												
			7	SS	41												
			8	SS	46												
			9	SS	31												
			10	SS	70												
			11	SS	124												
498.6	152.0		12	SS	191												
48.0	Silty sand, traces of clay and some gravel. Dense to very dense.		13	SS	48												22 44 30 4
			14	SS	152												
476.5			15	SS	100.2												
70.1	End of borehole.																

20
15-5 % STRAIN AT FAILURE
10

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

DESIGN SERVICES BRANCH			RECORD OF BOREHOLE NO 7			FOUNDATIONS OFFICE		
WP 659-93-01			Co-ords N 4840373.4, E 255493.2			IMPERIAL		
JOB 72-11022			LOCATION Co-ord's 880,490 N. 970,122 E.			ORIGINATED BY V.K.		
W.P. 213-65			BORING DATE March 7, 1972			COMPILED BY V.K.		
DATUM Geodetic			BOREHOLE TYPE Auger and Sample with C.M.E. Machine.			CHECKED BY		
SOIL PROFILE		SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT — W _L PLASTIC LIMIT — W _P WATER CONTENT — W ₁ W ₂ — W ₁ WATER CONTENT % 10 20 30	BULK DENSITY P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER					
548.8	Ground level.							
0.0	Het. mix. of clayey silt, sand & gravel. Glacial Till.		1	SS	14			
			2	SS	29			
534.8	Brown.		3	SS	29			
14.0	Grey.		4	SS	14			
	Stiff to hard.		5	SS	13			
			6	SS	28			
			7	SS	20			
			8	SS	21			
			9	SS	20			
502.8	153.3							
46.0	Sandy silt to silty sand with traces of clay and gravel. Very dense.		10	SS	100			
			11	SS	57			
			12	SS	74			
468.3			13	SL	100			
80.5	Shale Bedrock.		14	BXL	Rec.			
463.3	Grey Sand				90%			
85.5	End of borehole.							

20
15 5 % STRAIN AT FAILURE
10

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS-ONTARIO

DESIGN SERVICES BRANCH				RECORD OF BOREHOLE NO 8				FOUNDATIONS OFFICE					
WP 659-93-01				Co-ords: N 4840 392.6, E 295 684.7				ORIGINATED BY V.K.					
JOB 72-11022				LOCATION Co-ord's 880,553 N. 970,094 E.				COMPILED BY V.K.					
W.P. 213-65				BORING DATE March 8, 1972				CHECKED BY					
DATUM Geodetic				BOREHOLE TYPE Auger and Sample with C.H.E. Machine.									
SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT		PLASTIC LIMIT		WATER CONTENT		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	20	40	60	80	100		
545.6	Ground level.												
0.0	Het. mix. of clayey silt, sand & gravel. Glacial Till.		1	SS	34	540							
			2	SS	40								
334.6	Brown.		3	SS	55								
11.0	Grey.		4	SS	21	530							
			5	SS	22								
	Very stiff to hard.		6	SS	38								
			7	SS	43								
			8	SS	50	520							
			9	SS	89								
			10	SS	96	510							
504.6	153.8		11	SS	109								
41.0	Silty sand with traces of clay and gravel.					500							
	Very dense.												
494.6			12	SS	108								
51.0	Het. mix. of clayey silt, sand & gravel. Glacial Till.					490							
	Hard.		13	SS	97								
						480							
475.5			14	SS	100/11								
70.1	End of borehole.					470							

20
15
10
5
% STRAIN AT FAILURE

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS - ONTARIO

DESIGN SERVICES BRANCH				RECORD OF BOREHOLE NO 9				FOUNDATIONS OFFICE								
WP 659-93-01				CO-ORDS: N 4840414.2, E 295475.5				IMPERIAL								
JOB 72-11022				LOCATION Co-ord's RHO, 624 N, 970,064 E,				ORIGINATED BY V.K.								
W.P. 213-65				BORING DATE March 6, 1972				COMPILED BY V.K.								
DATUM Geodetic				BOREHOLE TYPE Auger and Sample with C.M.E. Machine				CHECKED BY								
SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT		PLASTIC LIMIT		WATER CONTENT		BULK DENSITY		REMARKS		
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	20	40	60	80	100	W _p	W _L	W	P.C.F.	
542.1	Ground level.															
0.0	Net. Mix. of clayey silt, sand and gra. Glacial Till.		1	SS	27	540										
			2	SS	41											2 24 53 21
531.1	Brown		3	SS	57	530										
11.0	Grey		4	SS	39											
	Very stiff to hard.		5	SS	39											
			6	SS	51											
			7	SS	61											
			8	SS	41											
			9	SS	22											
			10	SS	133											3 19 68 10
			11	SS	150											
494.1	EL 150.0		12	SS	73											
48.0	Silty sand, gravel with traces of clay.		13	SS	162											47 41 10 2
488.1	Very dense.															
54.0	Net. mix. of clayey silt, sand & gravel. Glacial Till Hard.		14	SS	116											
	Fragments of shale		15	SS	1007											
458.1			16	BXL	1007											
84.0	Shale bedrock.		17	BXL	Rec. 1007											
453.1	Grav. Sound															
89.0	End of borehole.															

20
15-5 % STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

148.8

DESIGN SERVICES BRANCH			RECORD OF BOREHOLE NO 1			FOUNDATIONS OFFICE			
WP 660-93-01			Co-ords. N 4840614.8, E 295 645.3			IMPERIAL			
JOB 72-11023			LOCATION			ORIGINATED BY VK			
W.P. 48-71-02			BORING DATE Feb. 21, 1972			COMPILED BY VK			
DATUM Gravitic			BOREHOLE TYPE Auger & sample with C.M.E. machine			CHECKED BY			
SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. LOT	NUMBER	TYPE	BLOWS/FOOT	WATER CONTENT %	WATER CONTENT %		
513.5	Ground Level								
0.0	Het. mix. of clayey silt, sand & gravel. (Glacial Till)	P.	1	SS	12				
			2	SS	16				
533.5	Brown		3	SS	15				
10.0	Grey		4	SS	27				
	Stiff to Hard		5	SS	25				
			6	SS	27				
			7	SS	27				
			8	SS	31				
			9	SS	17				
			10	SS	21				
			11	SS	20				
			12	SS	30				
			13	SS	16				
			14	SS	41				
480.5			15	SS	22				
63.0	Weathered Shale		16	SS	100				
			17	SSL	100				
470.0			18	SSL	50				
73.5	Sound Shale Redrock		19	SSL	100				
465.5	Grey								
78.0	End of Borehole								

 70
 15 \div 5 % STRAIN AT FAILURE
 10

DESIGN SERVICES BRANCH

WP 660-93-01

RECORD OF BOREHOLE NO 2

 Co-ords. N 4840 592.2; E 295 596.3
 Co-ords. 15,881,208 N; 969,804 E.

FOUNDATIONS OFFICE

IMPERIAL

JOB 72-11023

LOCATION

ORIGINATED BY VK

W.P. 18-71-02

BORING DATE February 27, 1972

COMPILED BY VK

DATUM Geodetic

BOREHOLE TYPE Auger & sample with C.M.E.

CHECKED BY

SOIL PROFILE			SAMPLES			ELEV SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100		LIQUID LIMIT — w_L PLASTIC LIMIT — w_P WATER CONTENT — w		BULK DENSITY Y P.C.F	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT		SHEAR STRENGTH P.S.F. ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE		WATER CONTENT % 10 20 30			
543.0	Ground Level											
0.0	Het. mix. of clayey silt, sand & gravel. (Glacial Till)		1	SS	11	540						541.
			2	SS	11							6 15 54 25
532.0	Brown		3	SS	20	530						
11.0	Grey		4	SS	22							
			5	SS	17							
	Stiff to Hard		6	SS	23	520						
			7	SS	22							
			8	SS	24	510						
			9	SS	30							
			10	SS	26	500						0 48 47 5
505.0												
38.0	Silty sand with traces of clay.		11	SS	87	490						
495.0	Very Dense											
48.0			12	SS	22	480						
482.7												
60.3	Weathered		13	SS	100 5"	470						
	Shale Bedrock											
472.8												
70.2	End of Borehole											

 20
 15 5 % STRAIN AT FAILURE
 10

DESIGN SERVICES BRANCH				RECORD OF BOREHOLE NO 3				FOUNDATIONS OFFICE						
WP 660-93-01				Co-ords. N 4840 612.3 ; E 295 616.4				IMPERIAL						
JOB 72-11021				LOCATION Co-ords. 15,881,271 N; 969,870 E.				ORIGINATED BY VK						
W.P. 18-71-02				BORING DATE March 2, 1972				COMPILED BY VK						
DATUM Gaudetie				BOREHOLE TYPE Auger and sample with C.M.E. machine				CHECKED BY C.H.						
SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE			LIQUID LIMIT			BULK DENSITY	REMARKS	
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	BLOWS / FOOT	RESISTANCE	W _L	W _P	W _U			
511.0	Ground Level													
0.0	Silty clay with some sand & gravel, traces of organics. Stiff		1	SS	15	540								GR SA. SI CL
532.0			2	SS	25									
5.0	Mixture of clayey		3	SS	20									
533.0	Brown		4	SS	19									
11.0	Grey		5	SS	14									
	Silt, sand & gravel (Glacial Till)		6	SS	18									
	with occ. layers of silty clay.		7	SS	10									
			8	SS	10									
	Stiff to Hard		9	SS	13									
508.5			10	SS	12									
35.5	Silty sand with traces of clay.		11	SS	69									
501.0	Very Dense													
43.0														
			12	SS	18									
			13	SS	112									
180.0														
41.0	Weathered Shale													
173.8														
70.2	End of Borehole													

OFFICE REPORT SOIL EXPLORATION

20
15
10

3
5
% STRAIN AT FAILURE

DESIGN SERVICES BRANCH			RECORD OF BOREHOLE NO 4			FOUNDATIONS OFFICE			
WP 660-93-01			Co-ords. N 4840 632.4 ; E 295 637.7			IMPERIAL			
JOB 72-11-23			LOCATION			ORIGINATED BY VK			
W.P. 68-71-02			BORING DATE Feb. 24, 1972			COMPILED BY VE			
DATUM Geodetic			BOREHOLE TYPE Auger and sample with C.M.E. Machine			CHECKED BY CLK			
SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS/FOOT	20 40 60 100	PLASTIC LIMIT	WATER CONTENT		
543.8	Ground Level								
0.0	Silty clay with some sand & gravel, traces of organics. Stiff	1	SS	6					543.3
538.8	5.0	2	SS	12					1 24 57 18
532.8	11.0	3	SS	18					
	Brown Grey silt, sand & gravel (Glacial Till)	4	SS	14					
	Stiff to Hard	5	SS	23					
		6	SS	23					
		7	SS	25					
		8	SS	24					
		9	SS	14					
507.8	36.0	10	SS	29					
504.8	39.0	11	SS	30					
	Silty sand & thin layers of clay. Compact	12	SS	14					
		13	SS	59					
479.8	64.0								
	Weathered Shale								
473.3	70.5	14	SS	100	5				
	End of Borehole								

 20
15 5 % STRAIN AT FAILURE
10

OFFICE REPORT SOIL EXPLORATION

DESIGN SERVICES BRANCH			RECORD OF BOREHOLE NO 5			FOUNDATIONS OFFICE			
WP 660-93-01			Co-ords. N 4840 609.9, E 295 587.4			IMPERIAL			
JOB 72-11023			LOCATION Co-ords. 15,881,266 W; 969,775 E.			ORIGINATED BY VK			
W.P. 48-71-02			BORING DATE Feb. 29, 1972			COMPILED BY VK			
DATUM Geodetic			BOREHOLE TYPE Auger and sample with G.M.E. machine			CHECKED BY			
SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE		LIQUID LIMIT		BULK DENSITY	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PIOT	NUMBER	TYPE	BLOWS/FOOT	ELEV. SCALE	WATER CONTENT %		
543.2	Ground Level								
0.0	Het. mix. of clayey silty sand and gravel (Glacial Till)		1	SS	10	540			539.2
			2	SS	15				8 34 11 17
531.7	Brown Grey		3	SS	21				
11.5			4	SS	28	530			
	Stiff to Hard		5	SS	20				
			6	SS	24				
			7	SS	30	520			
			8	SS	29				
			9	SS	23				
509.2			10	SS	17	510			1 82 (17)
36.0	Silty sand & traces of clay & grav. - Compact		11	SS	100				
506.2									
37.0									
498.2						500			
45.0	Silty sand & traces of clay and gravel.		12	SS	10				1 86 (13)
485.2	Compact					490			
54.0									
			13	SS	100	480			
479.2									
64.0	Weathered Shale Bedrock					470			
470.7			15	SH	27				
72.5	Sound Shale Bedrock		16	SH	100				
467.7									
75.5	End of Borehole					460			

DESIGN SERVICES BRANCH WP 660-93-01				RECORD OF BOREHOLE NO 6 Co-ords. N 4840 634.9, E 295 612.7 Co-ords. 881,348 N; 969,858 E.				FOUNDATIONS OFFICE IMPERIAL			
JOB 72-11023				LOCATION _____				ORIGINATED BY <u>VK</u>			
W.P. 10-62-02 47-71-02				BORING DATE Nov. 13, 1972				COMPILED BY <u>VK</u>			
DATUM Geodetic				BOREHOLE TYPE Auger & sample with OZ Machine				CHECKED BY <u>SK</u>			

SOIL PROFILE			SAMPLES		ELEV. SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT 20 40 60 80 100	LIQUID LIMIT <u> </u> W _L PLASTIC LIMIT <u> </u> W _P WATER CONTENT <u> </u> W ₁	BULK DENSITY <u> </u> γ P.C.F.	REMARKS
ELEV. DEPTH	DESCRIPTION	STRAT. PLT	NUMBER	TYPE					
513.8	Ground Level								
0.0	Brown Grey Heterogeneous mixture of clayey silt, sand and gravel (Glacial Till) Stiff to Hard		1	SS	31				534.8 ↓
			2	SS	15				
			3	SS	24				
			4	SS	24				
			5	SS	20				
			6	SS	24				
			7	SS	19				
			8	SS	21				
			9	SS	13				
			10	TV	PH				
			11	SS	160				
494.8	Silty sand and few gravel.		12	SS	45				
49.0									
486.8	Dense								
57.0									
460.8	Bedrock		13	SS	57				
73.0									
477.8	Weathered Slate								
66.0	End of Borehole								

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE No 2

W P 49-71-07 LOCATION Co-ords: N15,891,975; E966,042 ORIGINATED BY BRL
DIST 6 HWY 427 BOREHOLE TYPE 3 1/2" Diam. HSA and Cone Test COMPILED BY BL
DATUM Geodetic DATE August 13, 1979 CHECKED BY RS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100	Wp	W	WL	
526.3	Ground Surface															
0.0	Silty sand, brown to dark brown, laminated and slightly cemented. Compact		1	SS	19		520									5 61 (34)
519.3	Glacial Till		2	SS	11											
7.0	Silty sand some gravel, very dense		3	SS	58											50 38 (12)
			4	SS	138											
			5	SS	146											
509.3			6	SS	167		510									
17.0	Silty clay, Sand with gravel, very dense		7	SS	100											30 65 (5)
	Some sand, reddish, hard		8	SS	59											
			9	SS	76											
497.3			10	SS	50		500									
			11	SS	98											
29.0	Shale bedrock, fine textured fissile with occasional limestone bands		12	SS	140	11"										
			13	SS	100	5"	490									
			14	BX	-											
481.3			15	BX	-											
45.0	End of Borehole															

RECORD OF BOREHOLE No 3

W.P. 49-71-07 LOCATION Co-ords: N15,892,066; E966,032 ORIGINATED BY BRL
 DIST 6 HWY 427 BOREHOLE TYPE 3 1/2" Diam. BSA and Cone Test COMPILED BY BL
 DATUM Geodetic DATE August 16, 1979 CHECKED BY RS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES			20	40						60	80	100	WATER CONTENT (%)
								SHEAR STRENGTH							10	20	30	
							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE											
527.4	Ground Surface													GR SA SI CL				
0.0	Silty fine sand, slightly cemented, compact to dense		1	SS	31		520							23 48 (29)				
520.4			2	SS	20													
7.0	Glacial Till	3	SS	112	9"													
	Silty sand, some gravel, very dense	4	SS	87														
		5	SS	37														
510.4		6	SS	148	11"													
17.0	Glacial Till, clayey silt, dark grey, hard	7	SS	128			510											
507.2	Glacial Till, gravelly sand, very dense	8	SS	160	11"													
19.5		9	SS	56														
505.4	Sand and gravel	10	SS	74														
22.0	Silty clay, some sand seams, reddish, hard																	
498.4	Sand with angular to sub-round gravel, very dense	11	SS	182	9"		500											
29.0																		
493.9	Shale bedrock, weathered	12	SS	100	4"													
33.5																		
490.9																		
36.5	End of Borehole																	

+3, x3: Numbers refer to
Sensitivity

20
15 5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 4

W.P. 49-71-07 LOCATION Co-ords: N15,892,142; E966,033 ORIGINATED BY BRL
 DIST 6 HWY 427 BOREHOLE TYPE 3 1/2" Diam. RSA and Cone Test COMPILED BY BL
 DATUM Geodetic DATE August 15, 1979 CHECKED BY PS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100				
530.2	Ground Surface															
0.0	Glacial Till Clayey silt, with fine gravel, very stiff — Brown Grey		1	SS	33		530									
			2	SS	33											
			3	SS	15											
518.2			4	SS	22		520									
12.0	Glacial Till Silty sand, some gravel, very dense		5	SS	151											
			6	SS	100/5"											
			7	SS	115/6"											
508.2			8	SS	100/5"		510									
22.0	Glacial Till, clayey silt, dark grey, hard		9	SS	100/4"											
505.2			10	SS	100/5"											
25.0	Glacial Till, silty sand, gravelly, very dense															
501.2			11	SS	100/4"		500									
29.0	Silty clay, some sand, reddish, hard		12	SS	156/2"											
494.2																
36.0	Shale bedrock, weathered															
488.7			13	SS	100/3"		490									
41.5	End of Borehole															

3, x5 : Numbers refer to
Sensitivity

20
15 5 (%) STRAIN AT FAILURE
10

30M 12-144

RECORD OF BOREHOLE No 5

W P 49-71-05/06 LOCATION Co-ords. N 15,891,951; E 966,084 ORIGINATED BY BRL
 DIST 6 HWY 427 BOREHOLE TYPE 3 1/2" Diameter RSA COMPILED BY BL
 DATUM Geodetic DATE August 22, 1979 CHECKED BY RS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100										WATER CONTENT (%)		
								SHEAR STRENGTH ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE										10 20 30		
525.0	Ground Level															GR SA SI CL				
0.0	Sandy silt, brown, dense		1	SS	41															
520.5			2	SS	47		520													
4.5	Glacial Till, Silty sand, some gravel, grey, very dense		3	SS	80											28 41 (31)				
			4	SS	100/	6"														
			5	SS	100/	4"														
	silty clay		6	SS	128/	10"	510													
			7	SS	69											26 53 (21)				
501.0			8	SS	100/	5 "	500													
24.0	Silty clay, some sand, reddish, hard		9	SS	131/	10"														
494.0			10	SS	100/	3"	490													
31.0	Shale bedrock, weathered																			
489.5																				
35.5	End of Borehole																			

*3, *5: Numbers refer to
Sensitivity

20
15 * 5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 6

W P 49-71-05/06 LOCATION Co-ords. N 15,892,042; E 966,097 ORIGINATED BY BRL
DIST 6 HWY 427 BOREHOLE TYPE 3 1/2" Diameter HSA and Cone Test COMPILED BY BL
DATUM Geodetic DATE August 17, 1979 CHECKED BY RS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			'N' VALUES	20 40 60 80 100	Wp	W	WL		
520.3	Ground Level												
0.0	Glacial Till Silty sand, some gravel, grey, very dense		1	SS	43								
			2	SS	115	6"							
			3	SS	151								
			4	SS	100	3"							
			5	SS	185	8"							
504.8			6	SS	173								
15.5	Silty clay, some sand reddish brown, hard		7	SS	150								
499.8			8	SS	119								
20.5 496.8	Gravelly sand, very dense		9	SS	119								
23.5	Shale bedrock, fine textured and fissile, weathered		10	SS	164								
			11	SS	100	5"							
487.8			12	SS	120	5"							
32.5	End of Borehole												

+3, x5: Numbers refer to
Sensitivity

20
15 ϕ 5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 7

W P 49-71-05/06

LOCATION Co-ords. N 15,892,121; E 966,093

ORIGINATED BY BRL

DIST 6 HWY 427

BOREHOLE TYPE 3 1/4" Diameter HSA and Cone Test

COMPILED BY BL

DATUM Geodetic

DATE August 16, 1979

CHECKED BY PS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40					
530.0	Ground Level													
0.0	Glacial Till Clayey silt, trace of gravel, brown, very stiff		1	SS	36									
			2	SS	17									
520.5	firm, grey		3	SS	2									
9.5	Glacial Till Silty sand, some gravel, grey, very dense		4	SS	100	3"								12 64 (24)
	silty clay		5	SS	114									
			6	SS	100	5"								
			7	SS	100	5"								
			8	SS	100	4"								
505.5			9	SS	100	5"								33 52 (15)
24.5	Silty clay, reddish		10	SS	122									
27.0	End of Borehole													

+3, x5: Numbers refer to Sensitivity

20
15 5 (%) STRAIN AT FAILURE
10

OFFICE RECORDS USE SOIL EXAMINATIONS

RECORD OF BOREHOLE No 8

W P 49-71-05/06 LOCATION Co-ords. N 15,891,803; E 966,240 ORIGINATED BY BRL
 DIST 6 HWY 427 BOREHOLE TYPE 3 1/2" Diameter and Cone Test COMPILED BY BL
 DATUM Geodetic DATE August 23, 1979 CHECKED BY RS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
522.0	Ground Level																
0.0	Sand, trace of clay and gravel, compact		1	SS	19		520										
517.5			2	SS	28												
4.5	Glacial Till		3	SS	153												
	Silty sand, trace to some gravel, compact to very dense		4	SS	114												
	silty clay		5	SS	185												
505.0			6	SS	90												
17.0	Silty clay, reddish, hard		7	SS	125												
	some gravel		8	SS	112												
498.0			9	SS	145												
24.0	Gravelly sand, very dense		10	SS	110												
494.0			11	SS	110												
28.0	Shale bedrock, fine textured and fissile, weathered																
486.5																	
35.5	End of Borehole																

+³, x⁵: Numbers refer to
Sensitivity

20
15
10
5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 9

W P 49-71-05/06

LOCATION Co-ords. N 15,891,895; E 966,208

ORIGINATED BY BRL

DIST 6 HWY 427

BOREHOLE TYPE 3 1/2" Diameter HSA

COMPILED BY BL

DATUM Geodetic

DATE August 23, 1979

CHECKED BY RS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
522.1	Ground Level																
0.0	Sand to sand trace of and gravel organics		1	SS	12		520										GR SA SI CL
			2	SS	15												
512.6			3	SS	27												46 40 (14)
9.5	Glacial Till Silty sand, some gravel, grey, very dense		4	SS	160		510										9 35 (56)
			5	SS	123/10"												
			6	SS	72												
			7	SS	76												
498.1			8	SS	159		500										26 57 (17)
490.1	Silty clay, some sand, reddish, hard		9	SS	113/9"												
490.1	gravelly		10	SS	144/9"		490										
32.0	Shale bedrock, weathered		11	SS	100/3"												
486.6																	
35.5	End of Borehole																

+3, x5: Numbers refer to
Sensitivity20
15 5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 10

W P 49-71-05/06 LOCATION Co-ords. N 15,891,989; E 966,213 ORIGINATED BY BRL
 DIST 6 HWY 427 BOREHOLE TYPE 3 1/2" Diameter RSA and Cone Test COMPILED BY BL
 DATUM Geodetic DATE August 24, 1979 CHECKED BY RS

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE						
522.6	Ground Level													
0.0	Glacial Till Silty sand, grey trace to some gravel, very dense		1	SS	58		520							
			2	SS	54									
			3	SS	100	4"								45 18 (37)
			4	SS	104									
			5	SS	94	6"	510							4 43 (53)
			6	SS	100	5"								
503.6			7	SS	118									
19.0	Silty clay, trace of sand, reddish, hard		8	SS	133	10"	500							
			9	SS	135	8"								
493.6														
29.0	Shale bedrock, fissile and weathered		10	SS	125	5"	490							
486.1			11	SS	125	2"								
36.5	End of Borehole													

+3, x⁵: Numbers refer to
Sensitivity

20
15
10

5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 11

W P 49-71-05/06 LOCATION Co-ords. N 15,892,042; E 966,254 ORIGINATED BY BRL
 DIST 6 HWY 427 BOREHOLE TYPE 3 1/2" Diameter RSA COMPILED BY BL
 DATUM Geodetic DATE August 13, 1979 CHECKED BY RS

SOIL PROFILE		STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
530.6	Ground Level																GR SA SI CL
0.0	Glacial Till Silty sand, some gravel, dense		1	SS	35		530										50 40 (10)
			2	SS	39												
			3	SS	49												
			4	SS	35		520										
			5	SS	110												
			6	SS	123												
			7	SS	183	11"											
			8	SS	147	11"	510										
508.6			9	SS	143	6"											
22.0	Silty clay, some sand, reddish, hard		10	SS	109												
			11	SS	70												
			12	SS	140	9"	500										
			13	SS	100	4"											
			14	SS	143	10"											
492.6																	
38.0	Shale bedrock,																
489.1	weathered		15	SS	105	6"	490										
41.5	End of Borehole																

+3, x5: Numbers refer to
Sensitivity

20
15
10
5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-01

1 OF 4

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 049.2 E 294 356.2 ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.12.01 - 2008.12.03 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT		UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	W P W L	W P W L			
180.3	TOPSOIL (50mm)		1	SS	16								
	Silty CLAY, with sand, trace gravel Stiff to Very Stiff Brown (FILL)		2	SS	17								8 24 34 34
			3	SS	27								
			4	SS	30								
			5	SS	15								7 31 37 25
			6	SS	24								
171.1	Silty CLAY, trace to some sand, trace gravel, occasional iron oxide Hard Brown (TILL)		7	SS	50								

ONTMT4S 9270.GPJ 6/29/09

Continued Next Page

+ 3. X 3. Numbers refer to
Sensitivity 20 15 10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-01

2 OF 4

METRIC

G.W.P. 202-95-00

LOCATION N 4 845 049.2 E 294 356.2

ORIGINATED BY GA

HWY 427

BOREHOLE TYPE Solid Stem Auger

COMPILED BY AN

DATUM Geodetic

DATE 2008.12.01 - 2008.12.03

CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT			UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	T _N VALUES			20 40 60 80 100	W _P W W _L	WATER CONTENT (%)	20 40 60			
	Continued From Previous Page													
	Silty CLAY, trace to some sand, trace gravel, occasional iron oxide Hard Brown (TILL)		8	SS	70		170							0 4 79 17
	Occasional layers of clayey silt						169							
			9	SS	63		168							
							167							
			10	SS	81		166							
							165							
	with sand		11	SS	41		164							6 35 43 16
							163							
			12	SS	51		162							
							161							
160.5			13	SS	50									
19.8														

ONTMT4S 9270.GPJ 6/29/09

Continued Next Page

+³ × 1³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

METRIC

CHECKED BY SKP

Continued Next Page

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-01

4 OF 4

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 049.2 E 294 356.2 ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.12.01 - 2008.12.03 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE					WATER CONTENT (%)				
							20	40	60	80	100	W _p	W	W _L			
	Continued From Previous Page																
149.4	SHALE, moderately weathered, thinly bedded, frequent limestone and siltstone interbeds Grey		3	RUN			150									RUN 3# TCR=100%, SCR=23%, RQD=7%	
30.9	END OF BOREHOLE AT 30.9m. BOREHOLE BACKFILLED WITH BENTONITE GROUT TO SURFACE.																

ONTMT4S 9270.GPJ 6/29/09

RECORD OF BOREHOLE No CNH-02

1 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 073.9 E 294 349 3 ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY MFA
 DATUM Geodetic DATE 2008.12.08 - 2008.12.09 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				
171.1							20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE			PLASTIC LIMIT w _p NATURAL MOISTURE CONTENT w LIQUID LIMIT w _L		
0.0	Silty CLAY, with sand, trace gravel Stiff to Very Stiff Brown (TILL)		1	SS	13		171					
							170					
				2	SS	28		169				
	Occasional layers of grey clayey silt						168					
				3	SS	22		167				
	Grey						166					
				4	SS	25		165				
165.3							164					
5.8	Hard		5	SS	46		163					
							162					
			6	SS	56							
			7	SS	79							

ONTMT4S 9270.GPJ 6/29/09

Continued Next Page

+ 3 . X 3: Numbers refer to
Sensitivity 20
15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-02

2 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 073.9 E 294 349.3 ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY MFA
 DATUM Geodetic DATE 2008.12.08 - 2008.12.09 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	120 140 160 180 200	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
	Continued From Previous Page													
160.5	Silty CLAY, with sand, trace gravel Hard Grey (TILL)						161							
10.7	Silty SAND, trace clay, trace gravel Very Dense Grey Wet		8	SS	105		160							
							159							
			9	SS	107		158							
							157							
							156							
			10	SS	112		155							
							154							
							153							
	occasional cobbles													
			11	SS	111									
			12	SS	112									
	Layer of sand and gravel													
152.4			13	SS	104/ 150									
18.7	END OF BOREHOLE AT 18.7m. BOREHOLE OPEN TO 18.7m AND WATER LEVEL AT 8.2m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE GROUT TO 2.1m, THEN SEALED WITH BENTONITE HOLEPLUG TO SURFACE.													

ONTMT4S 9270.GPJ 6/29/09

+ 3 X 3 : Numbers refer to
Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

METRIC

CHECKED BY SKP

Continued Next Page

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-03

2 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 094.6 E 294 347.1 ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY MFA
 DATUM Geodetic DATE 2008.12.11 - 2008.12.11 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	40 80 120 160 200	W _p	W	W _L					
	Continued From Previous Page																
160.9	Silty CLAY, trace to some sand, trace gravel Hard Grey (TILL)						161										
10.7	Silty SAND, trace to some gravel, occasional cobbles Very Dense Grey Wet		8	SS	116		160										
	Shale fragments, occasional inferred cobbles and boulders		9	SS	123		159										
157.7							158										
13.9	END OF BOREHOLE AT 13.9m. BOREHOLE OPEN TO 12.8m AND WATER LEVEL AT 0.3m UPON COMPLETION OF DRILLING. Piezometer installation consists of 25mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.01.21 6.1 165.5 2009.05.05 5.6 166.0 2009.06.08 5.5 166.1		10	SS	109/	150											

+³. X³: Numbers refer to Sensitivity 20 15 10 5 10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-04

1 OF 3

METRIC

G.W.P. 202-95-00

LOCATION N 4 845 119.7 E 294 338.6

ORIGINATED BY WB

HWY 427

BOREHOLE TYPE Solid Stem Auger

COMPILED BY MFA

DATUM Geodetic

DATE 2008.12.15 - 2008.12.15

CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	40 80 120 160 200	20 40 60					
181.3	ASPHALT: (75mm)														
0.0 0.1	SILT and SAND, some gravel, trace clay Dense to Very Dense Brown Moist (FILL)		1	SS	60		181								
			2	SS	43		180								
			3	SS	31										
			4	SS	60		179								
			5	SS	52		178								
177.3	Silty CLAY, with sand, trace gravel Very Stiff to Hard Brown (TILL)														
4.0			6	SS	23		177								
							176								
			7	SS	25		175								
							174								
			8	SS	48										
							173								
			9	SS	44		172								

Continued Next Page

+ ³ × ³ Numbers refer to Sensitivity 20 15 10 5 0 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-04										2 OF 3		METRIC				
G.W.P. 202-95-00			LOCATION N 4 845 119.7 E 294 338.5			ORIGINATED BY WB										
HWY 427			BOREHOLE TYPE Solid Stem Auger			COMPILED BY MFA										
DATUM Geodetic			DATE 2008.12.15 - 2008.12.15			CHECKED BY SKP										
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60						80
Continued From Previous Page																
	Silty CLAY, with sand, trace gravel Hard Brown (TILL)		10	SS	30	V	171									
								170								
			11	SS	100/ 275			169								
								168								
			12	SS	80			167								
								166								
			13	SS	89			165								
						164										
163.4						163										
17.8	SILT and SAND, some clay, trace gravel Very Dense Grey Moist		15	SS	100/ 225		162									
			16	SS	100/											

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Continued Next Page

+ 3 . X 3 : Numbers refer to
Sensitivity 20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-04

3 OF 3

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 119.7 E 294 338.5 ORIGINATED BY WB
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY MFA
 DATUM Geodetic DATE 2008.12.15 - 2008.12.15 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
	Continued From Previous Page							20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
	SILT and SAND, some clay, trace gravel Very Dense Grey Moist				.100		161							
			17	SS	100/ .100		160					○		
							159							
158.0	Moist to Wet		18	SS	100/ .225							○		
23.2	END OF BOREHOLE AT 23.2m AND WATER LEVEL AT 11.6m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG AND CUTTINGS TO 0.075m, THEN ASPHALT TO SURFACE.													

ONTM14S 9270.GPJ 6/29/09

+ 3 . X 3 : Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-05

1 OF 3

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 053.1 E 294 358.8 ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.12.04 - 2008.12.04 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	40 80 120 160 200					
180.2														
0.0	TOPSOIL (75mm)													
0.1	Silty CLAY, with sand, trace gravel Stiff to Very Stiff Brown (FILL)		1	SS	14									
			2	SS	17									
			3	SS	20									
			4	SS	18									
			5	SS	22									
			6	SS	27									
171.6	Silty CLAY, some sand, trace gravel Hard Brown to Grey (FILL)		7	SS	31									

ONTMT4S 9270.GPJ 6/29/09

Continued Next Page

+ 3 . X 3 Numbers refer to
Sensitivity 20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-05

2 OF 3

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 053.1 E 294 358.8 ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.12.04 - 2008.12.04 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
	Continued From Previous Page												
	Silty CLAY, some sand, trace gravel Hard Brown (TILL)		8	SS	41								
			9	SS	38								
			10	SS	60								
			11	SS	48								
			12	SS	54								
	Hard augering		13	SS	80								

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Continued Next Page

+ ³ . x ³ . Numbers refer to
Sensitivity 20 15 10 5 10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-05

3 OF 3

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 053.1 E 294 358.8 ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
 DATUM Geodetic DATE 2008.12.04 - 2008.12.04 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
	Continued From Previous Page							SHEAR STRENGTH kPa						
								O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE						
								WATER CONTENT (%)						
								PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT						
								W P W L 20 40 60						
158.9	Silty CLAY, some sand, trace gravel Hard Brown (TILL)		14	SS	92		160							
21.3	Silty SAND, trace clay, trace gravel Very Dense Grey Wet		15	SS	121		159							5 64 23 8
	Hard augering						158							
			16	SS	128		157							
155.8	Some gravel, some clay, occasional shale fragments, occasional cobbles and boulders Hard augering		17	SS	115		156							11 45 29 15
24.4	Highly weathered shale						155							
154.1	END OF BOREHOLE AT 26.1m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE OPEN TO 26m AND WATER LEVEL AT 11.8m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.01.21 14.5 165.7 2009.05.05 14.2 166.0 2009.06.08 14.2 166.0		18	SS	105/	0.150								

+ 3, X 3 Numbers refer to
Sensitivity 20 15 10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-06

1 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 080.9 E 294 358.3 ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY MFA
 DATUM Geodetic DATE 2008.12.09 - 2008.12.10 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)		
								○ UNCONFINED	+ FIELD VANE	● QUICK TRIAXIAL				× LAB VANE	
171.4							20	40	60	80	100				
0.0	Silty CLAY, with sand, trace gravel Stiff to Very Stiff Brown (TILL)		1	SS	11									GR SA SI CL	
	Occasional iron oxide staining														
			2	SS	28										
168.5															
2.9	Hard trace sand		3	SS	50										0 3 68 29
	Grey		4	SS	48										
			5	SS	34										
	with sand	6	SS	48										2 31 47 20	

Continued Next Page

+ 3. x 3: Numbers refer to
Sensitivity 20
15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-06

2 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 080.9 E 294 358.3 ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY MFA
 DATUM Geodetic DATE 2008.12.09 - 2008.12.10 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	120 140 160 180 200	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
	Continued From Previous Page							SHEAR STRENGTH kPa						
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE						
								WATER CONTENT (%)						
								40 80 120 160 200		20 40 60				
160.7	Silty CLAY, with sand, trace gravel Hard Grey (TILL)						161							
10.7	Silty SAND, some gravel, trace clay Very Dense Grey Wet		8	SS	101		160							11 55 25 9
			9	SS	110		159							
	Hard augering						158							
			10	SS	122		157							
155.8			11	SS	101		156							
15.5	END OF BOREHOLE AT 15.5m. BOREHOLE OPEN TO 15.2m AND WATER LEVEL AT 5.8m UPON COMPLETION OF DRILLING. Piezometer installation consists of 25mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.01.21 6.1 165.3 2009.05.05 4.9 166.5 2009.06.08 4.9 166.5													

ONTMT4S 9270.GPJ 6/29/09

+ 3 X 3 Numbers refer to
Sensitivity 20 15 10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-07

1 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 100.9 E 294 354.5 ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY MFA
 DATUM Geodetic DATE 2008.12.12 - 2008.12.12 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
171.6 0.0	Silty CLAY, with sand, trace gravel Stiff Mottled Brown to Grey (TILL)		1	SS	10		171						0 46 50 4
							170						
			2	SS	9		169						
							168						
	Occasional iron oxide staining Very Stiff		3	SS	26		167						
							166						
167.1 4.4	Hard Grey		4	SS	30		165						
							164						0 46 50 4
165.6 5.9	Layer of sandy silt Very Dense		5	SS	60		163						
							162						
164.7 6.9			6	SS	79								
			7	SS	71								

ONTMT4S 9270.GPJ 6/29/09

Continued Next Page

+ ³ . X ³ : Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-07

2 OF 2

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 100.9 E 294 354.5 ORIGINATED BY GA
 HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY MFA
 DATUM Geodetic DATE 2008.12.12 - 2008.12.12 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	120 140 160 180 200	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
	Continued From Previous Page							SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE						
160.9	Silty CLAY, with sand, trace gravel Hard Grey (TILL)						161							
10.7	Silty SAND, trace gravel Very Dense Grey Wet		8	SS	101		160							
			9	SS	115		159							
	Hard augering													
	occasional inferred cobbles						158							
			10	SS	111		157							
156.0			11	SS	122									
15.5	END OF BOREHOLE AT 15.5m. BOREHOLE OPEN TO 14.6m AND WATER LEVEL AT 0.5m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE GROUT TO 1.5m. THEN SEALED WITH BENTONITE HOLEPLUG TO SURFACE.													

ONTMT4S 9270.GPJ 6/29/09

+ 3. x 3: Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

1 OF 2

G.W.P. 202-95-00

LOCATION N 4 845 128.7 E 294 354.8

ORIGINATED BY WB

HWY 427

BOREHOLE TYPE Solid Stem Auger

COMPILED BY AN

DATUM Geodetic

DATE 2008.12.18 - 2008.12.18

CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)
								○ UNCONFINED	+ FIELD VANE	● QUICK TRIAXIAL			
181.3	ASPHALT: (75mm)												
0.0 0.1	Gravelly SAND Very Dense Brown Moist (FILL)		1	SS	53								
180.3													
1.1	SILT and SAND, trace clay Loose Brown Moist (FILL)		2	SS	7								
176.8													
4.6	Silty CLAY, with sand, trace gravel Hard Brown (TILL)		3	SS	30								
	Occasional layers of silty sand		4	SS	42								
			5	SS	30								

Continued Next Page

Continued Next Page

+³, X³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No CNH-08

2 OF 2

METRIC

G.W.P. 202-95-00

LOCATION N 4 845 128.7 E 294 354.8

ORIGINATED BY WB

HWY 427

BOREHOLE TYPE Solid Stem Auger

COMPILED BY AN

DATUM Geodetic

DATE 2008.12.18 - 2008.12.18

CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	40 80 120 160 200					
	Continued From Previous Page													
	Silty CLAY, with sand, trace gravel Hard Brown (TILL)		6	SS	35		171							1 21 38 40
			7	SS	100/ 0.275		170							
			8	SS	100/ 0.225		169							
			9	SS	100/ 0.250		168							
165.7	Hard augering						167							
15.6	END OF BOREHOLE AT 15.6m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.075m THEN ASPHALT TO SURFACE.						166							4 32 43 21

ONTMT4S 9270.GPJ 6/29/09

+³ ×³: Numbers refer to
Sensitivity 20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-09

1 OF 1

METRIC

G.W.P. 202-95-00 LOCATION N 4 845 035.8 E 294 359.8
 HWY 427 BOREHOLE TYPE Solid Stem Auger
 DATUM Geodetic DATE 2008.12.05 - 2008.12.05
 ORIGINATED BY GA
 COMPILED BY AN
 CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
179.8	TOPSOIL (50mm)													
0.0	Silty CLAY, with sand, trace gravel Stiff to Very Stiff Brown (FILL)		1	SS	12									
			2	SS	16									
			3	SS	8									
			4	SS	27									
			5	SS	26									
173.1														
6.7	END OF BOREHOLE AT 6.7m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.													

+ 3 . X 3 . Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No CNH-10

1 OF 1

METRIC

G.W.P. 202-95-00

LOCATION N 4 845 130.8 E 294 336.8

ORIGINATED BY WB

HWY 427

BOREHOLE TYPE Solid Stem Auger

COMPILED BY MFA

DATUM Geodetic

DATE 2008.12.17 - 2008.12.17

CHECKED BY SKP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT Y kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	100	100	100	100		
181.3	ASPHALT: (75mm)													
0.0														
0.1	SILT and SAND, trace clay Dense to Compact Brown Moist (FILL)		1	SS	47		181							
			2	SS	47									
							180							
			3	SS	25									
			4	SS	24		179							
			5	SS	14		178							
177.0														
4.3	Silty CLAY, with sand, trace gravel Very Stiff Brown (TILL)		6	SS	16		177							
							176							
174.6			7	SS	15		175							
6.7	END OF BOREHOLE AT 6.7m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.075m, THEN ASPHALT TO SURFACE.													

+ 3, X 3: Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 1

METRIC

W P 153-80-02 LOCATION Co-ords. N 4 844 821.2; E 294 318.3 ORIGINATED BY V.P.
 DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Augers and Cone Test COMPILED BY V.P.
 DATUM Gravetric DATE 81-12-10 to 81-12-11 CHECKED BY GP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH ○ UNCONFINED * FIELD VANE ● QUICK TRIAXIAL x LAB VANE	PLASTIC LIMIT W _p NATURAL MOISTURE CONTENT W LIQUID LIMIT W _L WATER CONTENT (%)	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES						
171.9	Ground Surface										
0.0											
	Mottled		1	SS	9						
			2	SS	13						
			3	SS	29						
	Brown Grey		4	SS	27						
	(Glacial Till)		5	SS	21						
	Silty Clay		6	SS	15						
	with Sand		7	SS	14						
	trace of Gravel		8	SS	16						
	Stiff to Hard		9	SS	53						
			10	SS	37						
160.0											
11.9											
37.0	Silty Sand Dense		11	SS	27						
158.0											
	Boulder		12	Gr	-						
13.9	Break corebarrel in borehole										
45.4	Abandon hole										
	End of Borehole										
	* Borehole caved at shallow depth. Perched water level at 0.5 metres.										

OFFICE REPORT ON SOIL EXPLORATION

METRIC

ORIGINATED BY V.P.
COMPILED BY V.P.
CHECKED BY G.I.

* J, x^S: Numbers refer to Sensitivity

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE No 3

METRIC

W P 153-80-02 LOCATION Co-ords. N 4 844 869.0; E 294 354.2 ORIGINATED BY V.P.
 DIST 5 HWY 427 BOREHOLE TYPE Hollow Stem Augers/Solid Stem Augers 24.4 m to 33.4 m COMPILED BY V.P.
 DATUM Ganett's DATE 81-12-16, 81-12-17 and Cone Test CHECKED BY JP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100					
171.5	Ground Surface												GR SA SI CL
0.0	(Glacial Till)		1	SS	9		170						2-22-55-21
			2	SS	26								
			3	SS	49								
	Brown Grey		4	SS	50		168	104/17					5-12-51-32
	Silty Clay with Sand trace of Gravel		5	SS	28								
			6	SS	21		166						
	occ. Cobbles and Boulders		7	SS	26								
			8	SS	30		164						
	Stiff to Hard		9	SS	44		162						
161.1													
10.4	boulder		10	SS	36		160						22-48-25-5
34.1	Grey												
	Silty Sand to Sand Varying Amounts of Gravel		11	SS	105		158						2-71-25-2
			12	SS	58								
	Occasional Cobbles and Boulders throughout						156						
			13	SS	58	15 cm	154						44-42-(14)
	Alternating Seams and Layers of Silt, Sand and Gravel						152						
			14	SS	105	13 cm							
	Dense to Very Dense						150						
							140						
136.1													
33.4	Refusal to Solid Augers												
10.4	Possible Boulder or Bedrock End of Borehole												
	* Perched Water Table at 0.9 m Borehole Caved at 3.5 m												
	Note: This borehole is a combination of two borings the first meeting refusal at 10.7 metres on a probable boulder.												

* 3, x 5: Numbers refer to
Sensitivity

20
15 x 5 (%) STRAIN AT FAILURE
10

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE No 4										METRIC			
W.P. 153-20-02		LOCATION Co-ords N 4 844 838.7; E 294 313.7		ORIGINATED BY V.P.									
DIST 6 HWY 427		BOREHOLE TYPE Hollow Stem Auger and Cone Test		COMPILED BY V.P.									
DATUM Geodetic		DATE 81-12-18 to 81-12-21		CHECKED BY [Signature]									
SOIL PROFILE			SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			20	40					
171.4	Ground Surface												
0.0	(Glacial Till)		1	SS	42								
	Brown Grey		2	SS	60								1-17-67-15
	Silty Sand		3	SS	46								
	Silty Clay some Sand trace of Gravel		4	SS	75								
	Hard		5	SS	33								5-15-60-20
			6	SS	83								
			7	SS	45								
159.8													
11.6	Cobbles		8	SS	20								15-53-30-2
38.1	Grey Compact												
	Silty Sand		9	SS	84								
	to Gravel and Cobble layers												
	Sand		10	SS	105/15								6-75-(19)
	Varying Amounts of Gravel												
	occasional Cobbles and Boulders throughout		11	SS	115/13								12-51-33-4
	Very Dense												
148.5			12	SS	120/3								
22.9	End of Borehole												
25.1	* Borehole caved at 9.3 metres.												
	Perched Water Table												

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE No 6

METRIC

W P 153-80-02 LOCATION Co-ords. N 4 844 864.4; E 294 316.3
DIST 6 HWY 427 BOREHOLE TYPE Solid Stem Auger/Drive "B" Casing
DATUM Geodetic DATE 81-12-21
ORIGINATED BY V.P.
COMPILED BY V.P.
CHECKED BY CP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%)		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40						60	80
170.6	Ground Surface															
0.0	(Glacial Till)		1	SS	31	*	170									
			2	SS	44											4-26-52-18
	Brown Grey		3	SS	47		168									
	Silty Clay with Sand trace of Gravel		4	SS	35											2-4-82-12
			5	SS	40											
			6	SS	100/7	8 cm	166									
			7	SS	26		164									
	Hard		8	SS	40											
	Gravel & Cobbles		9	SS	31		162									
160.5			10	SS	36		160									2-10-56-32
10.1	Grey		11	SS	74		158									24-47-25-6
33.1	Silty Sand to Sand		12	SS	149/23	23 cm	156									3-56-35-6
	Cobbles		13	SS	168/23	23 cm	154									
	Varying Amounts of Gravel						152									
	Occasional Cobbles and Boulders throughout						150									
	Dense to Very Dense															
149.0			14	SS	145/21	21 cm										15-67-32-6
21.6	End of Borehole															
20.1	* Perched Water Level at Ground Surface. BH Caved at 6.9 m.															

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE No 7

METRIC

W P 153-80-02 LOCATION Co-ords. N 4 844 880.0; E 294 310.4 ORIGINATED BY V.P.
 DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Augers and Cone Test COMPILED BY V.P.
 DATUM Geodetic DATE 81-12-22 CHECKED BY CP

ELEV DEPTH	SOIL PROFILE DESCRIPTION	SOIL PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
			NUMBER	TYPE	'N' VALUES			20 40 60 80 100						
171.7	Ground Surface													
0.0	(Glacial Till)		1	SS	27	*	170							
			2	SS	44		168							
	Silty Clay with Sand trace of Gravel occ. cobbles		3	SS	30		166							
			4	SS	75		164							
	Very Stiff to Hard		5	SS	022/	22 B	162							
161.6			6	SS	40		160							
10.1	Grey Silty Sand to Sand		7	SS	107		158							
33.1			8	SS	79		156							
	Varying Amounts of Gravel		9	SS	103		154							
	occasional Cobbles and Boulders throughout		10	SS	102		152							
	Very Dense		11	SS	157/	20 C								
151.5	End of Borehole													
66.3	* Note: W.L. not established at time of investigation.													

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE No 8

METRIC

W P 153-80-02 LOCATION Co-ords. N 4 844 895.5; E 204 357.7 ORIGINATED BY V.P.
DIST 6 HWY 427 BOREHOLE TYPE Solid Stem Auger/"B" Casing COMPILED BY V.P.
DATUM Geodetic DATE 81-12-22 CHECKED BY [Signature]

[illegible]

3, x5: Numbers refer to Sensitivity

OFFICE REPORT ON SOIL EXPLORATION

RECORD OF BOREHOLE No 1

Metric

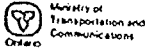
W.P. 153-80-02 LOCATION Co-ords. 4,845, 115N; 294, 281E ORIGINATED BY M.R.
 DIST. 6 HWY 427 BOREHOLE TYPE Hollow Stem Auger COMPILED BY S.P.
 DATUM Geodetic DATE February 17, 1982 CHECKED BY SP

OFFICE REPORT ON SOIL EXPLORATION

SOIL PROFILE			SAMPLES			GR. UND. WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100	WATER CONTENT (%)													
172.37	Ground Level																					
172.01	Topsoil, silty clay, low organic, dark brown		1	SS	10																	
0.31	Silty clay with sand, trace gravel, fissured, thin fine sand layers, (Glacial Till)		2	SS	7																	
170.15	Intermediate plasticity																					
2.13	Stiff to Firm, Brown			SS	37																	
	Silty clay with sand, trace gravel, fissured, thin sand layers (Glacial Till) Low Plasticity		4	SS	59																	
167.75	Hard, Brown		5	SS	30																	
4.57	becoming very stiff, Grey		6	SS	26																	
			7	SS	27																	
165.31																						
7.01	Silty sand fine to coarse with gravel, (Glacial Till)		8	SS	93																	
	Very Dense Grey		9	SS	100/280 mm																	
			10	SS	100/200 mm																	
			11	SS	100/280 mm																	
			12	SS	100																	
			13	SS	100/200 mm																	
16.17																						
16.15	Sand, fine with silt, occasional thin layers of silty clay		14	SS	80/180 mm																	
151.75	Very Dense Grey		15	SS	100/280 mm																	
18.57	End of Borehole																					
<p>Note: 1/2 hr. after sample 11, water at elevation 160.42 inside augers Upon completion of auguring, water at elevation 161.42 inside augers Piezometer installed at elevation 154.03 seal at elevation 163.48</p> <table border="1"> <thead> <tr> <th>Date</th> <th>Water Elevation</th> </tr> </thead> <tbody> <tr> <td>Feb. 13/82</td> <td>165.02</td> </tr> <tr> <td>Feb. 19/82</td> <td>165.42</td> </tr> <tr> <td>Feb. 26/82</td> <td>167.02</td> </tr> </tbody> </table>															Date	Water Elevation	Feb. 13/82	165.02	Feb. 19/82	165.42	Feb. 26/82	167.02
Date	Water Elevation																					
Feb. 13/82	165.02																					
Feb. 19/82	165.42																					
Feb. 26/82	167.02																					

3, x5; Numbers refer to
Sensitivity

20
15
10
5 (%) STRAIN AT FAILURE



RECORD OF BOREHOLE No 2

Metric

W.P. 153-00-02 LOCATION Co-ords. 4,845, 119N, 294, 317E
DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Auger
DATUM Geodetic DATE February 19, 1982
ORIGINATED BY H.R.V.
COMPILED BY S.P.
CHECKED BY SP

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES		20	40	60	80	100					
0	172.70	Ground Level														
2	172.05	Topsoil, silty clay, low organic Dark Brown														
	0.61	Silty clay with sand, trace gravel, fissured, thin fine sand layers (Glacial Till)	1	SS	10											
		Intermediate plasticity	2	SS	28											
10	169.65	Very Stiff Brown	3	SS	28											
	3.05	Silty clay with sand, trace gravel, fissured, thin fine sand layers (Glacial Till)	4	SS	42											
		Low plasticity	5	SS	32											
			6	SS	35											
		Hard Brown to Grey	7	SS	41											
23	165.69															
	7.01	Silty sand fine to coarse with gravel (Glacial Till)	8	SS	100											
30.7	163.28	Very Dense Grey	9	SS	1007 30 mm											
	9.42	End of Borehole														
<p>Note: After removal of augers upon completion of drilling, borehole caved at elevation 164.24, no free water</p>																

OFFICE REPORT ON SOIL EXPLORATION

*3, *5: Numbers refer to Sensitivity

20
15 * 5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 3

Metric

W.P. 153-80-02 LOCATION Co-ords. 4, R45, 141 N; 294, 277E
DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Auger ORIGINATED BY D.L.K.
DATUM Geodetic DATE February 18, 1982 COMPILED BY S.P.
CHECKED BY SP

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			20	40	60	80	100				
0.72-57	Ground Level														
0.72-81	Topsoil, silty clay, low organic, Dark Brown		1	SS	20	172									
0.76	Silty clay with sand, trace gravel, fissured, thin fine sand layers (Glacial Till)		2	TH	PH										
169.52	Intermediate plasticity Very Stiff to Hard Brown		3	SS	14	170									
3.05	Silty clay with sand, trace gravel, fissured, thin fine sand layers (Glacial Till)		4	SS	55										
	Low plasticity		5	SS	48										
	Hard to Brown Very Stiff to Grey		6	SS	25	168									
6.40	Silty sand fine to coarse with gravel (Glacial Till)		7	SS	44	166									
63.18	Very Dense Grey		8	SS	100/250 mm	164									
9.39	End of Borehole		9	SS	100/250 mm										

Note:
After removal of augers
upon completion of
drilling, water level
at elevation 163.89
Borehole caved at
elevation 164.04

OFFICE REPORT ON SOIL EXPLORATION

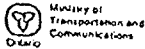
RECORD OF BOREHOLE No 4

Metric

W.P. 152-B0-02 LOCATION Co-ords 4, 845, 145 N. 294, 313E ORIGINATED BY D.I.K.
 DIST. 6 HWY. 427 BOREHOLE TYPE Hollow Stem Auger COMPILED BY S.P.
 DATUM Canadian DATE February 19, 1982 CHECKED BY SP

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE			20 40 60 80 100						
172.59	Ground Level												
172.28	Topsoil, silty clay, low organic, dark brown												
0.31	Silty clay with sand, trace gravel, fissured, thin fine sand layers (Glacial Till)		1	SS	18								
	Intermediate plasticity		2	SS	21								
				SS	28								
168.92	Very Stiff Brown		4	SS	24								
3.66	Silty clay with sand, trace gravel, fissured, thin fine sand layers, (Glacial Till)		5	SS	39								
	Low plasticity		6	SS	45								
166.45	Hard Grey												
6.10	Silty sand fine to coarse with gravel (Glacial Till)		7	SS	91								
			8	SS	88								
163.09	Very Dense Grey		9	SS	100/200 cm								
9.50	End of Borehole												
Note: After removal of augers on completion of drilling, water level and elevation 165.78 and borehole caved at elevation 165.68													

OFFICE REPORT ON SOIL EXPLORATION



RECORD OF BOREHOLE No 5

Metric

W P 153-80-02

LOCATION Co-ords. 4, 04S, 161N; 294, 274E

ORIGINATED BY B.L.K.

DIST 6

HWY 427

BOREHOLE TYPE

Hollow Stem Auger

COMPILED BY S.P.

DATUM Canadian

DATE February 18, 1982

CHECKED BY SP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL								
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			SHEAR STRENGTH									WATER CONTENT (%)							
0 172.89	Ground Level																							
2 172.28	Topsoil, silty clay, low organic (dark brown)																							
0.61	Silty clay with sand, trace gravel, fissured, thin fine sand layers (Glacial Till)		1	SS	26		172																	
	Intermediate plasticity		2	SS	27																			
	Very Stiff		3	SS	31																			
10 169.84	Hard Brown		4	SS	49		170																	
3.05	Silty Clay with sand, trace gravel, fissured, thin fine sand layers, (Glacial Till) low plasticity		5	SS	54																			
16 168.01	Hard Brown		6	SS	43		168																	
4.88	Silty sand, fine to coarse with gravel (Glacial Till)		7	SS	63																			
			8	SS	93		166																	
313 163.36	Very Dense Gray		9	SS	100/230 mm		164																	
9.53	End of Borehole																							
<p>Note: After removal of augers upon completion of drilling, water level at elevation 164.97 and borehole caved at elevation 165.57 Piezometer installed at elevation 163.44 seal at elevation 171.06</p> <table><tr><th colspan="2">Water Elevation</th></tr><tr><td>Date</td><td></td></tr><tr><td>Feb. 19/82</td><td>169.92</td></tr><tr><td>Feb. 26/82</td><td>170.51</td></tr></table> <p>(possible perched water infiltration)</p>																	Water Elevation		Date		Feb. 19/82	169.92	Feb. 26/82	170.51
Water Elevation																								
Date																								
Feb. 19/82	169.92																							
Feb. 26/82	170.51																							

OFFICE REPORT ON SOIL EXPLORATION

*3, *5: Numbers refer to Sensitivity

20
15 * 5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 6

Metric

W P 153-80-02 LOCATION Co-ords. 4, 845, 168N, 294, 309E
DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Auger
DATUM Geodetic DATE February 17/18, 1982
ORIGINATED BY B.J.L.K.
COMPILED BY S.P.
CHECKED BY R

OFFICE REPORT ON SOIL EXPLORATION

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100	50 100 150 200 kPa	QUICK TRIAXIAL	FIELD VANE					
173.22	Ground Level															
172.62	Topsoil, silty clay, low organic Dark Brown															
0.61	Silty clay with sand, trace gravel, fissured, thin fine sand layers (Glacial Till)		1	SS	15		172								20.1	
170.42	Intermediate plasticity Very Stiff Brown		2	SS	21											
2.74	Silty clay, with sand, trace gravel, fissured, thin fine sand layers, (Glacial Till)		3	TH	PH											
	Low plasticity		4	SS	59		170									
168.12	Hard Brown to Grey		5	S	52											
5.18	Silty sand, fine to coarse with gravel (Glacial Till)		6	SS	27		168									
			7	SS	08	250 mm										
			8	SS	100	200 mm	166									
	Very Dense Grey		9	SS	100	200 mm	164									
			10	SS	100	180 mm	162									
			11	SS	94		160									
			12	SS	100	150 mm										
157.52			13	SS	100	250 mm	158									
15.65	End of Borehole															

Note:
After removal of auger upon completion of drilling, water level at elevation 163.47 and borehole caved at elevation 167.43

*3, *5: Numbers refer to Sensitivity
20
15
10
5 (%) STRAIN AT FAILURE



RECORD OF BOREHOLE No 1

W P 153-80-04 LOCATION Co-ords. 4, 845, 498 N; 294, 227.5 E. ORIGINATED BY MT
DIST 6 HWY 427 BOREHOLE TYPE Hollow-stem auger COMPILED BY RR
DATUM Geodetic DATE February 12, 1982 CHECKED BY JRB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%)
Metres ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100					
175.63	Ground Level																
0.00	Topsoil 150 mm thick					Seal											
	Till, Silty Clay with some sand & gravel		1	SS	38		174										5 18 49 28
	Very Stiff to Hard Brown		2	SS	29												
172.73			3	SS	35												
2.90	Interbedded Silty Sand and Sandy Silt, 10 to 50 mm thick layers		4	SS	108		172										
			5	SS	59												
170.45	Very Dense. Brown		6	SS	115												
5.18	Fine Sand, silty		7	SS	78		170										
			8	SS	65	Water Level Mar. 1/82											
			9	SS	73		168										
			10	SS	125/25	25 mm											
			11	SS	73												
	Very Dense Brown to Grey		12	SS	35		166										
			13	SS	79												
			14	SS	72		164										
			15	SS	80/50	50 mm											
162.52							162										
13.11	Till, Silty Clay with some sand and gravel		16	SS	122/25	25 mm											
			17	SS	100/25	25 mm	160										9 28 40 23
			18	SS	100/50	50 mm											
	Very Hard Grey		19	SS	100/15	15 mm	158										
19.81	Fine Sand, silty					Seal											
20.43	Dense Grey		20	SS	W.H.	Piezometer	156										
154.08																	
21.55	End of Borehole		21	SS	100/200		154										
							152										

+3, x5: Numbers refer to
Sensitivity

20
15 \div 5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 2

W P 153-80-04 LOCATION Co-ords. 4, 845, 540 N; 294, 253 E. ORIGINATED BY MT
DIST 6 HWY 427 BOREHOLE TYPE Hollow-stem auger COMPILED BY RR
DATUM Geodetic DATE February 15, 1982 CHECKED BY JRB

[illegible]

RECORD OF BOREHOLE No 4

W P 153-80-04 LOCATION Co-ords. 4,845,572 N; 294,247 E. ORIGINATED BY MI
DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Auger COMPILED BY RR
DATUM Geodetic DATE February 16, 1982 CHECKED BY JRB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL					
Metres ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20 40 60 80 100								WATER CONTENT (%) 10 20 30				
								SHEAR STRENGTH ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE												
175.98	Ground Level																			
0.00	Topsoil, 150 mm thick						Seal													
	Till, silty clay, with some sand and gravel		1	SS	28															
	Very Stiff to Hard		2	SS	39		174													
172.78	Brown		3	SS	42															
3.20	Interbedded Silty Sand and Sandy Silt		4	SS	85/150	mm	Seal													
			5	SS	120		172													
170.80	Very Dense Brown		6	SS	81															
5.18	Fine Sand, Silty		7	SS	56		Water Level Mar. 1/82													
	Very Dense Brown		8	SS	48		170													
			9	SS	61															
168.06	Sand, seam, some gravel		10	SS	92		168													
7.92	Very Dense Brown		11	SS	118		Piezometer													
166.99			12	SS	50															
8.99																				
166.38																				
9.60	End of Borehole						166													
							164													

W P 153-80-04 LOCATION Co-ords. 4,845,533 N; 294,223 E. ORIGINATED BY MT
DIST 6 HWY 427 BOREHOLE TYPE Hollow Stem Auger COMPILED BY RR
DATUM Geodetic DATE February 16, 1982 CHECKED BY IRB

+3, x5: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 6

W P 153-80-04 LOCATION Co-ords. 4, 845, 514 N; 294, 256 E. ORIGINATED BY MT
 DIST 6 HWY 427 BOREHOLE TYPE Hollow-stem auger COMPILED BY RR
 DATUM Geodetic DATE February 15, 1982 CHECKED BY JRB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT Y	REMARKS & GRAIN SIZE DISTRIBUTION (%)
Metres ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	'N' VALUES			20	40	60	80	100		
75.33	Ground Level													
0.00	Topsoil, 150 mm thick													GR SA SI CL
	Till, silty clay, with some sand and gravel		1	SS	32		Seal							
	Very Stiff to Hard		2	SS	30		174							
	Brown		3	SS	45									
171.67			4	SS	35		Seal							
3.66	Interbedded Silty Sand and Sandy Silt		5	SS	73		172							
	Very Dense Brown		6	SS	55		Water Level Mar. 1/82							
			7	SS	89		170							0 35 62 3
168.62			8	SS	82									
6.71	Fine Sand, Silty		9	SS	76									
167.10	Very Dense Brown		10	SS	69		168							
8.23	Sand, with some Gravel		11	SS	69									
	Very Dense Gray		12	SS	34		166							
			13	SS	76		Piezometer							
164.20			14	SS	39									
11.13	End of Borehole						164							
							162							

Appendix C

List of Special Provisions and Suggested Text for NSSP

List of Special Provisions Referenced in this Report

SP 903S01 – Construction Specification for Installation of Caisson Piles

Suggested Text for NSSP on “Caisson Construction for HML Pole Foundations”

The Contractor is advised that variable types of subsurface materials may be encountered at the high mast lighting (HML) pole locations. For additional information regarding soil conditions, the Contractor is referred to the Foundation Investigation Report.

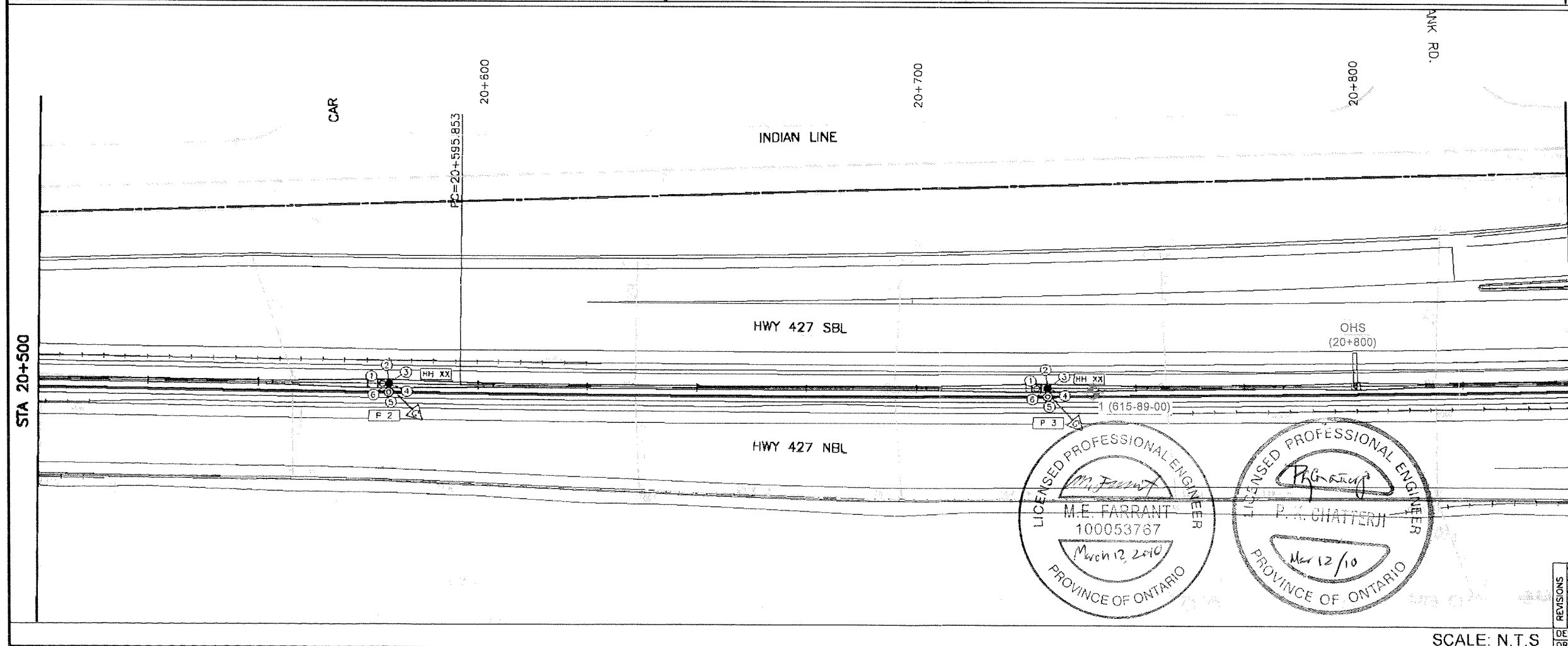
For bidding purposes, the Contractor shall assume the following:

1. The subsurface conditions at a HML location are the same as those encountered in the borehole closest to the subject HML location.
2. There is a probability that occasional cobbles and boulders may be encountered within the glacial till deposits. Obstructions may also be present within the fill. Caisson installation equipment must be able to penetrate these obstructions.
3. Water seepage and/or soil sloughing into the caisson hole will occur from existing fill and cohesionless soils at some locations. The cohesionless soils would be susceptible to disturbance under conditions of unbalanced hydrostatic head. Temporary liners shall be available on site, or be made available on very short notice, to support the caisson sidewalls and provide seepage cut-off where required.

The Contractor is responsible for constructing the high mast pole foundations without disturbing the material at the sides or bases of the foundations.

Appendix D

Borehole Location Drawings



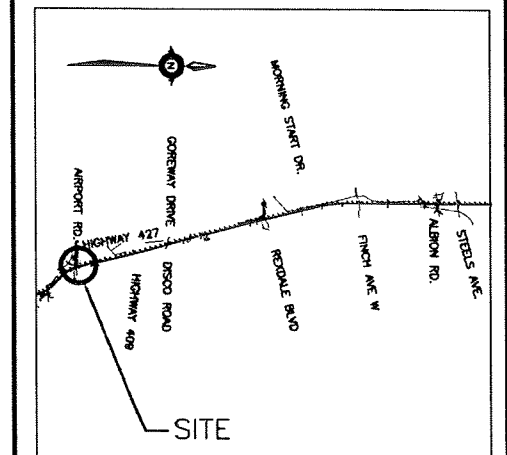
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AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 202-95-00



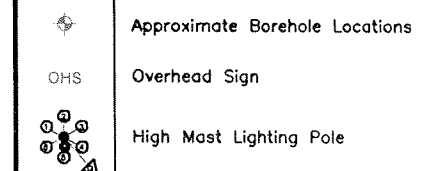
**HWY 427 WIDENING
FROM FASKEN DR. TO STEELES AVE.
PROPOSED HIGH MAST LIGHTING POLES
& OVERHEAD SIGN SUPPORTS**

SHEET



KEYPLAN

LEGEND

[illegible]

-NOTES-

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- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 30M12-291

SCALE: N.T.S

REVISIONS									
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DAWN	AN	CHK	SUE		STRUT	LOW			

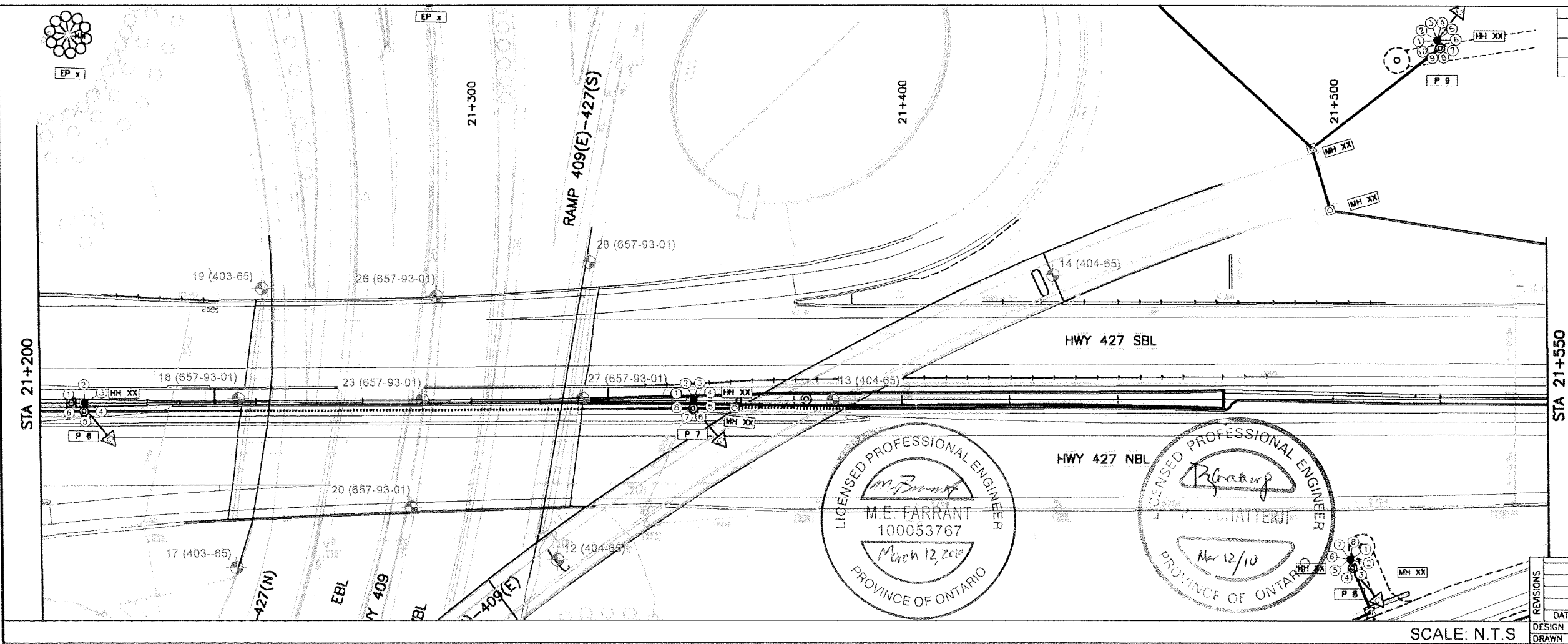
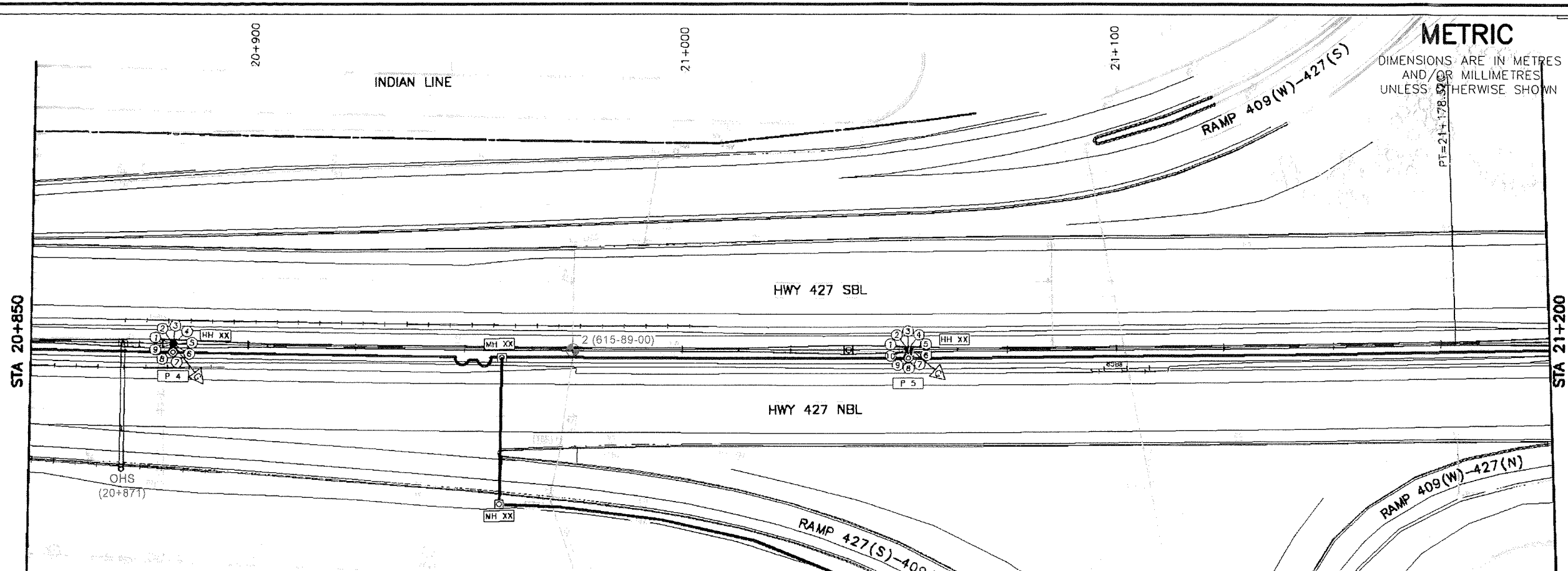
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LOCATION: _____

STA 20+850

STA 21+200

STA 21+200

STA 21+550



CONT No
GWP No 202-95-00

HWY 427 WIDENING
FROM FASKEN DR. TO STEELES AVE.
PROPOSED HIGH MAST LIGHTING POLES
& OVERHEAD SIGN SUPPORTS

SNC-LAVALIN

THURBER ENGINEERING LTD.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

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KEYPLAN

LEGEND

- Approximate Borehole Locations
- Overhead Sign
- High Mast Lighting Pole

NO	ELEVATION	NORTHING	EASTING

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GEOCRES No. 30M12-291

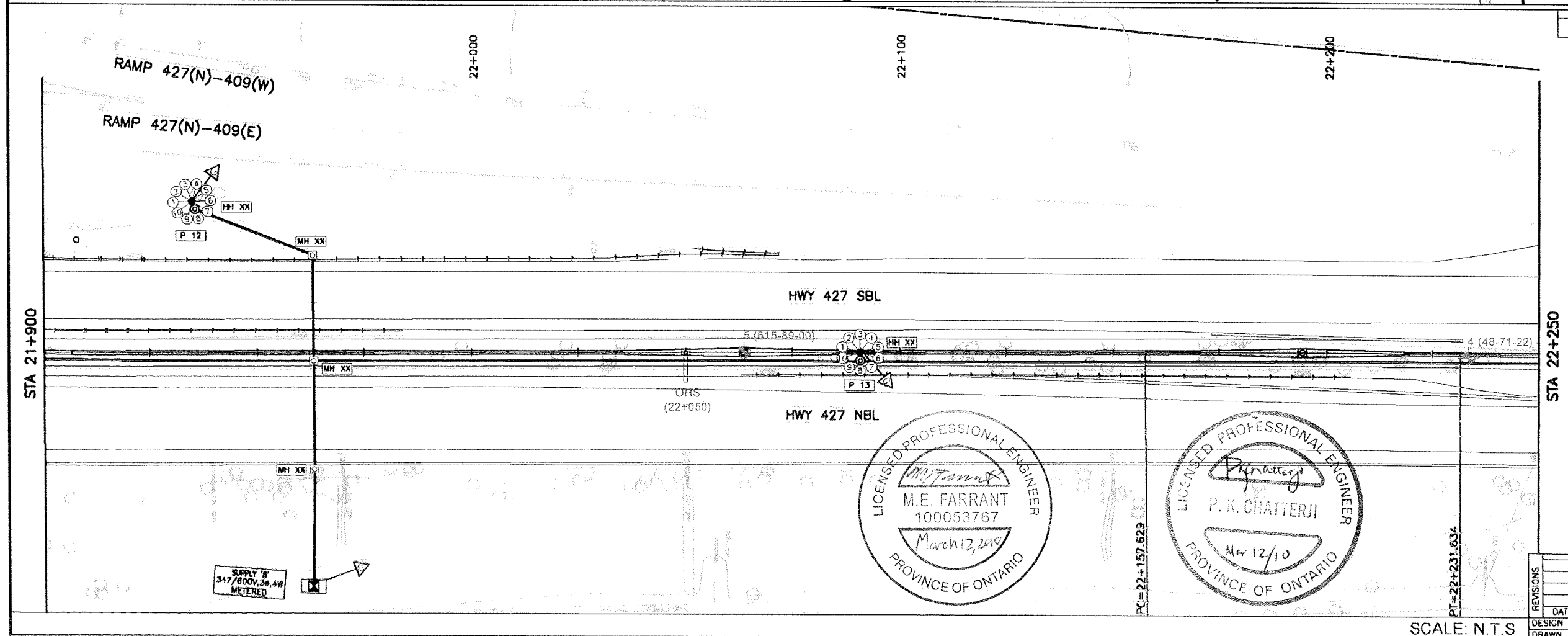
REVISIONS

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SCALE: N.T.S.

DATE: DEC. 2009

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METRIC

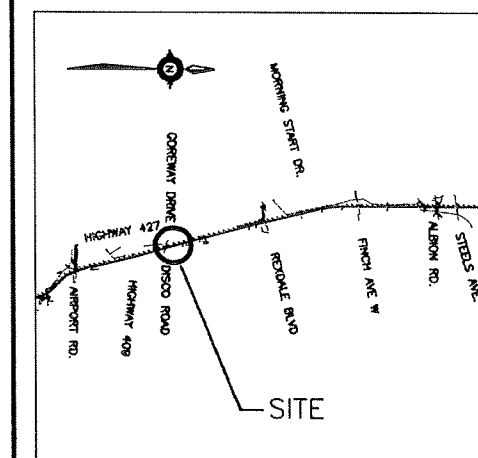
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 202-95-00





SHEET

**HWY 427 WIDENING
FROM FASKEN DR. TO STEELES AVE.
PROPOSED HIGH MAST LIGHTING POLES
& OVERHEAD SIGN SUPPORTS**



KEYPLAN
LEGEND

- | | |
|---|--------------------------------|
|  | Approximate Borehole Locations |
| OHS | Overhead Sign |
|  | High Mast Lighting Pole |

[illegible]

-NOTES-

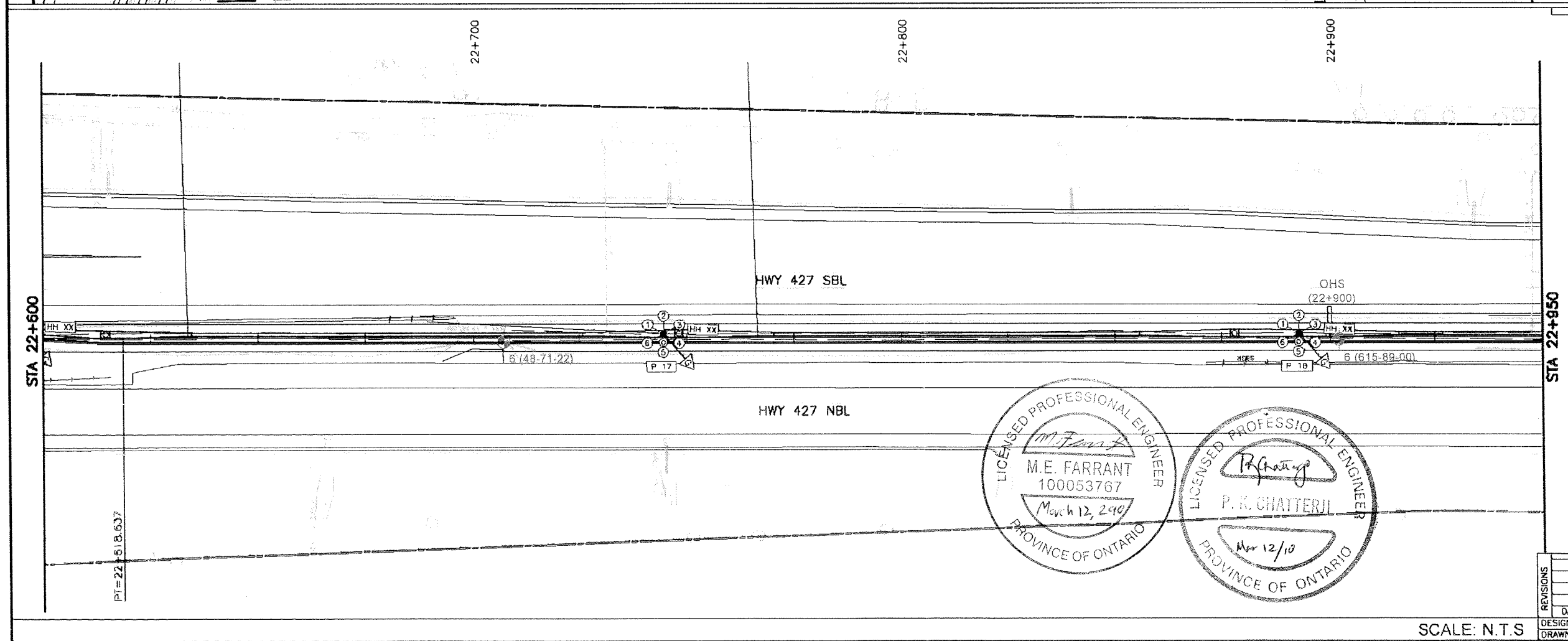
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GEOCRES No. 30M12-291

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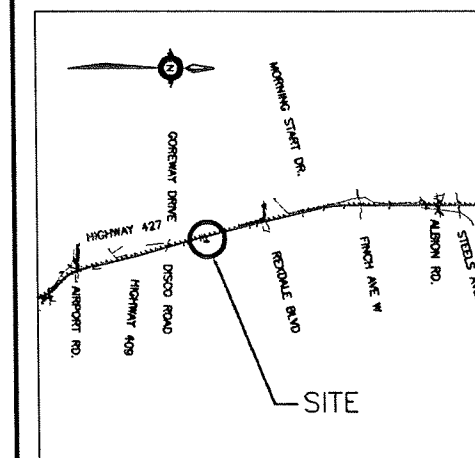


METRIC



DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 202-95-00

**HWY 427 WIDENING
FROM FASKEN DR. TO STEELES AVE.
PROPOSED HIGH MAST LIGHTING POLES
& OVERHEAD SIGN SUPPORTS**



KEYPLAN
LEGEND

- | | |
|---|--------------------------------|
|  | Approximate Borehole Locations |
| OHS | Overhead Sign |
|  | High Mast Lighting Pole |

[illegible]

-NOTES-

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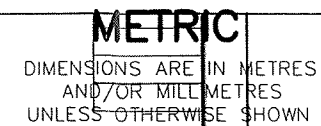
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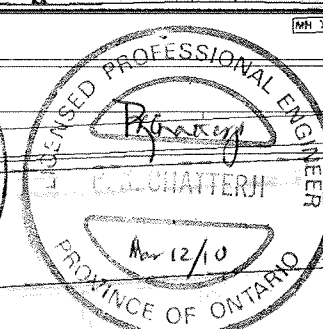
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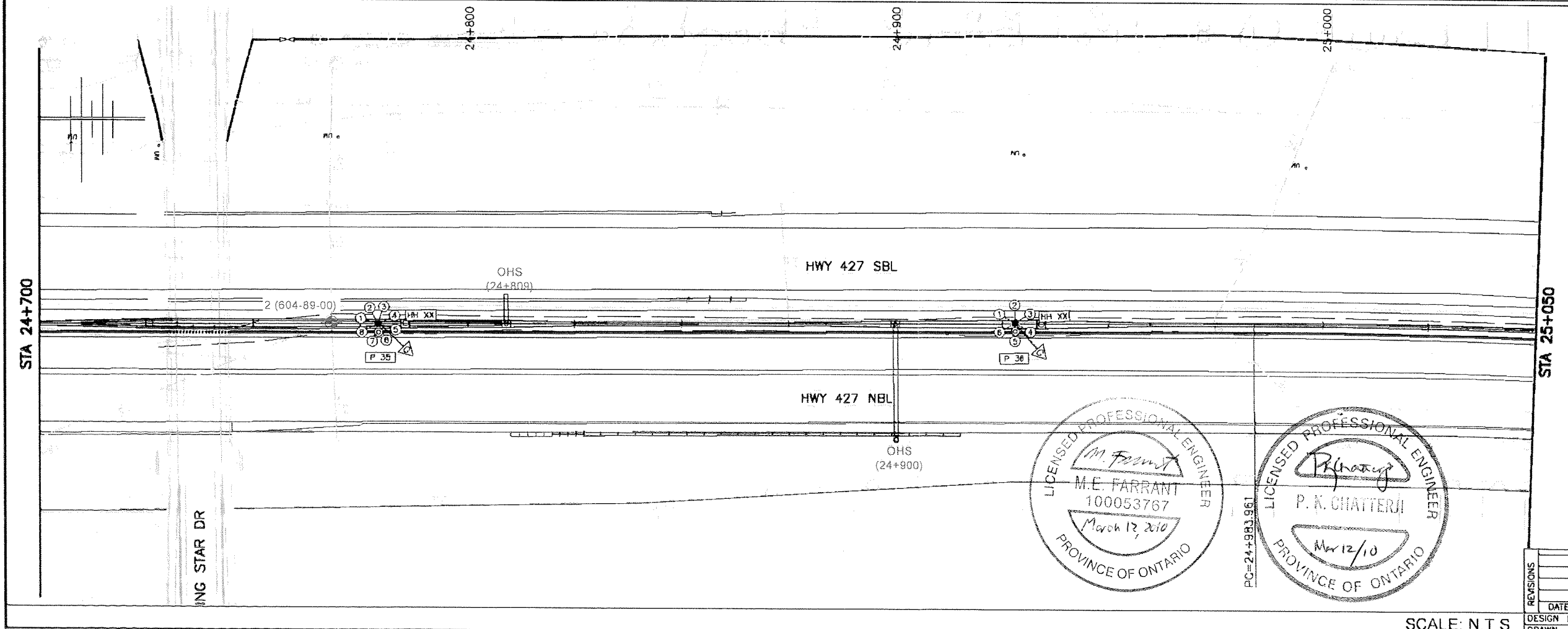
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GEOCRES No. 30M12-291



31/03/2015



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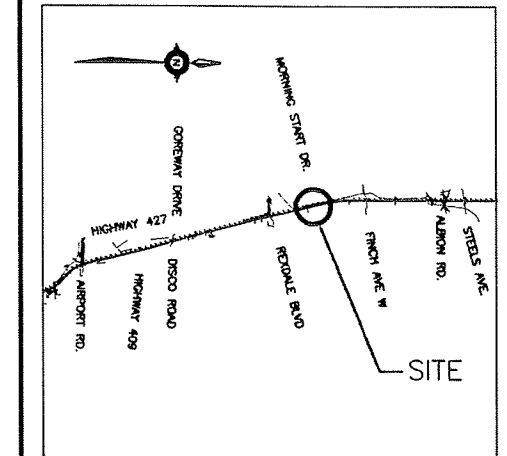
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 202-95-00





**HWY 427 WIDENING
FROM FASKEN DR. TO STEELES AVE.
PROPOSED HIGH MAST LIGHTING POLES
& OVERHEAD SIGN SUPPORTS**

SHEET



KEYPLAN

LEGEND

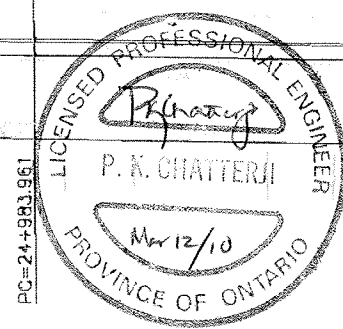
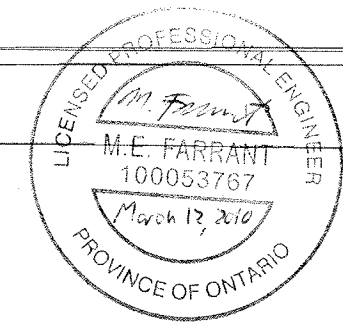
- | | |
|---|--------------------------------|
|  | Approximate Borehole Locations |
| OHS | Overhead Sign |
|  | High Mast Lighting Pole |

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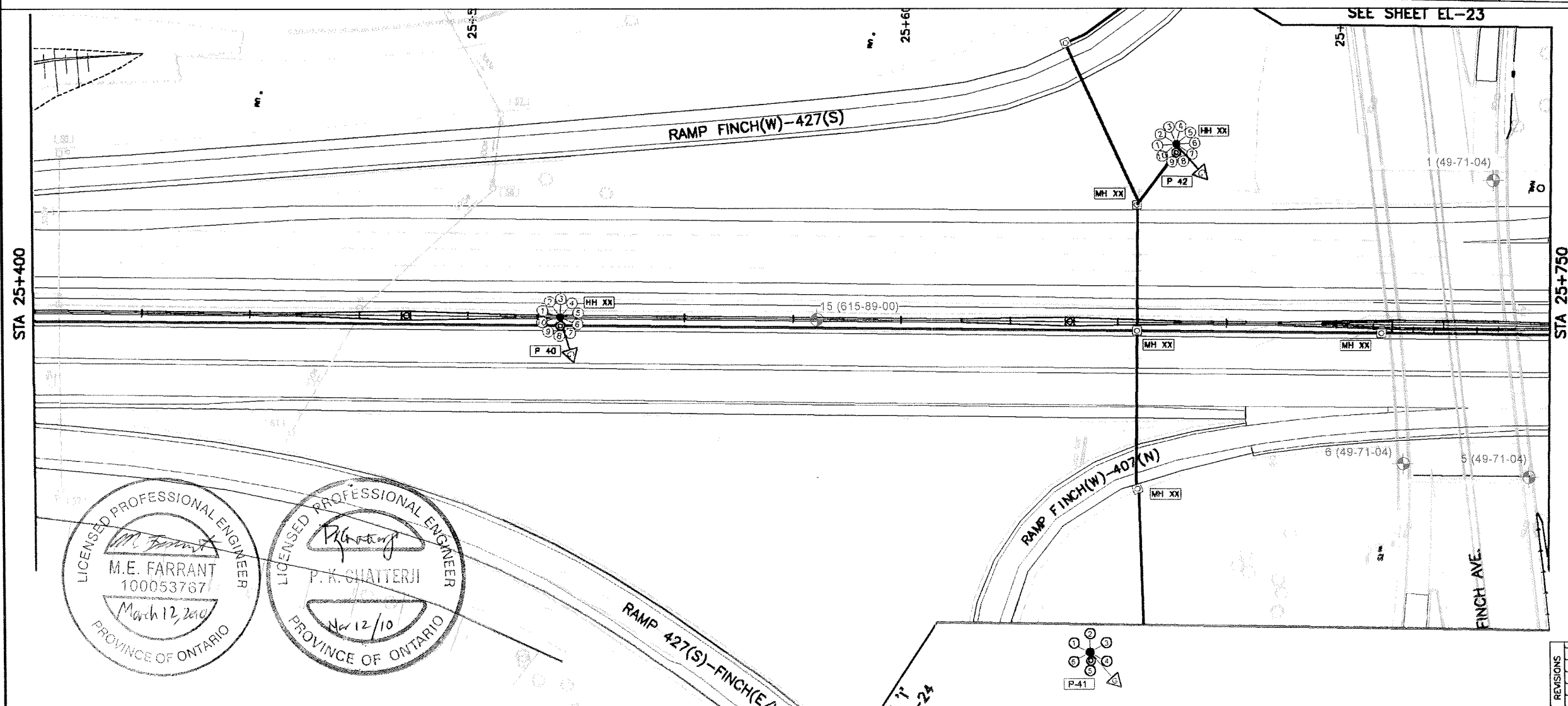
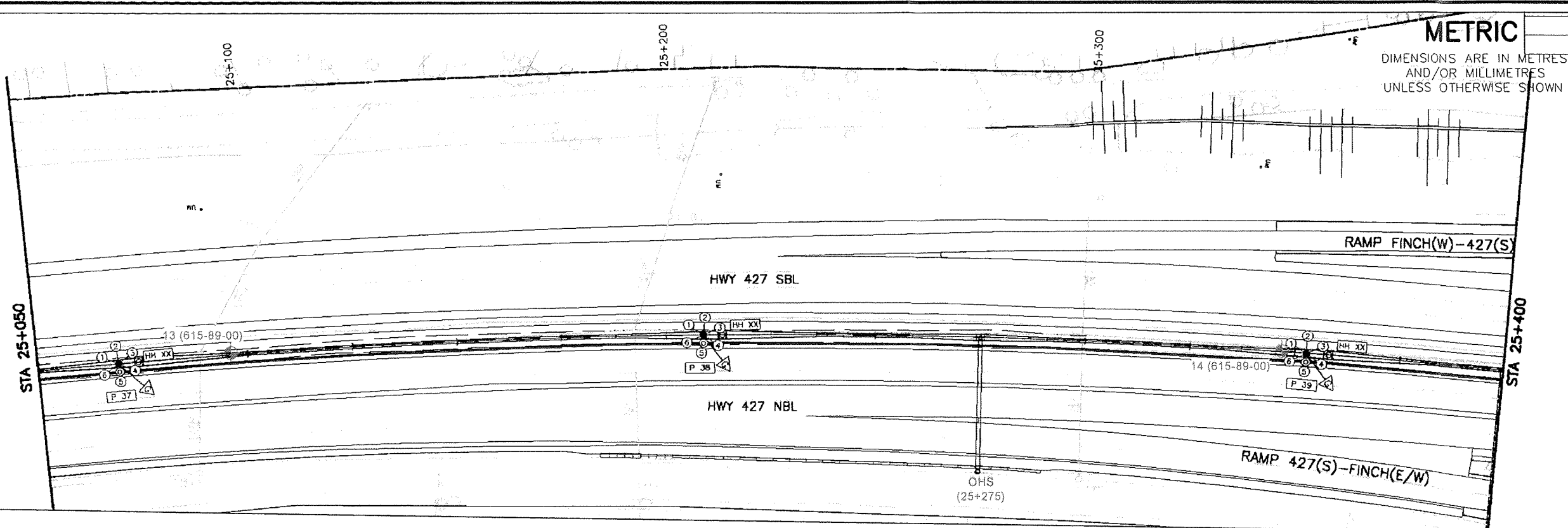
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GEOCREs No. 30M12-291



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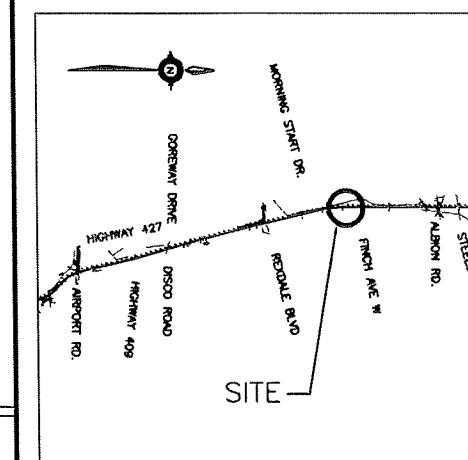
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GWP No 202-95-00





SHEET

**HWY 427 WIDENING
FROM FASKEN DR. TO STEELES AVE.
PROPOSED HIGH MAST LIGHTING POLES
& OVERHEAD SIGN SUPPORTS**



KEYPLAN

LEGEND

- | | |
|---|--------------------------------|
|  | Approximate Borehole Locations |
| OHS | Overhead Sign |
|  | High Mast Lighting Pole |

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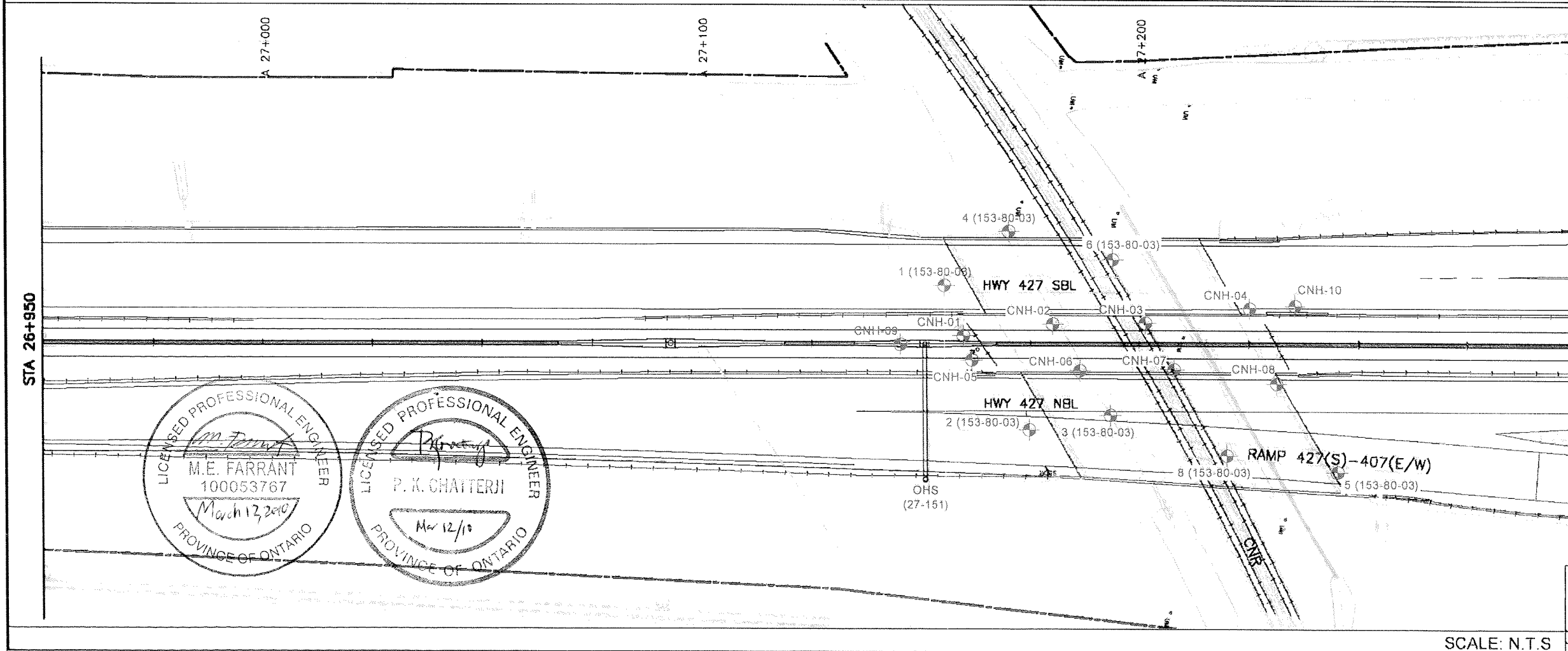
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GEOCRES No. 30M12-291

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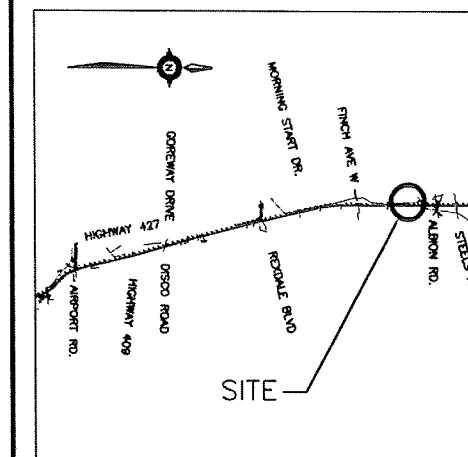
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AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

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GWP No 202-95-00



**HWY 427 WIDENING
FROM FASKEN DR. TO STEELES AVE.
PROPOSED HIGH MAST LIGHTING POLES
& OVERHEAD SIGN SUPPORTS**

SHEET



KEYPLAN

LEGEND



Approximate Borehole Locations

OH

Overhead Sign



High Mast Lighting Pole

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GEOCRES No. 30M12-291

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DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
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